WESTERN GAS

September 1931

20 Cents the Copy

Always a Better Regulator. At Last Perfection.

RELIANCE TYPE "H"

The outcome of 15 years earnest endeavor and our contribution to the development of the Gas Industry on the Pacific Coast.

RELIANCE MANUFACTURING CO.

1000 Meridian Ave. Alhambra, Calif.

A MONTHLY JOURNAL DEVOTED TO THE WESTERN GAS & APPLIANCE INDUSTRIES

PREVENT RECYCLING in Compressor Plants —with Nordstroms

Nordstrom Valves

A COMPLETE shut-off, in compressor lines—on inlet, outlet and by-pass—is absolutely essential, to prevent recycling through leaking valves. NORDSTROM VALVES *seal tightly.* "Sealdport" lubrication and other exclusive design advantages assure a complete shut-off regardless of pressure in the lines. This prevents compressor losses.

MERCO

The Perfect Application of a Principle

MERCO NORDSTROM VALVE COMPANY

SUBSIDIARY OF THE MERRILL COMPANY . . ENGINEERS

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Canada - Peacock Bros., Ltd., Montreal, Toronto, Winnipeg, Vancouver. (Also Sydney, N.S.)
England - Audley Engineering Co., Ltd., Newport, Shropshire.
Buenos Aires, Argentine, - General Electric, Soc. Anon., Victoria 618 Esq. Peru.

This station was moved from Los Angeles Basin to Elwood by Fluor Engineers

Complete service on: Absorption Plants, Compressor Stations, Refinery Equipment, Cooling Towers, Cooling Systems, Boiler Plants, Pump Stations, Machinery installation, General construction.

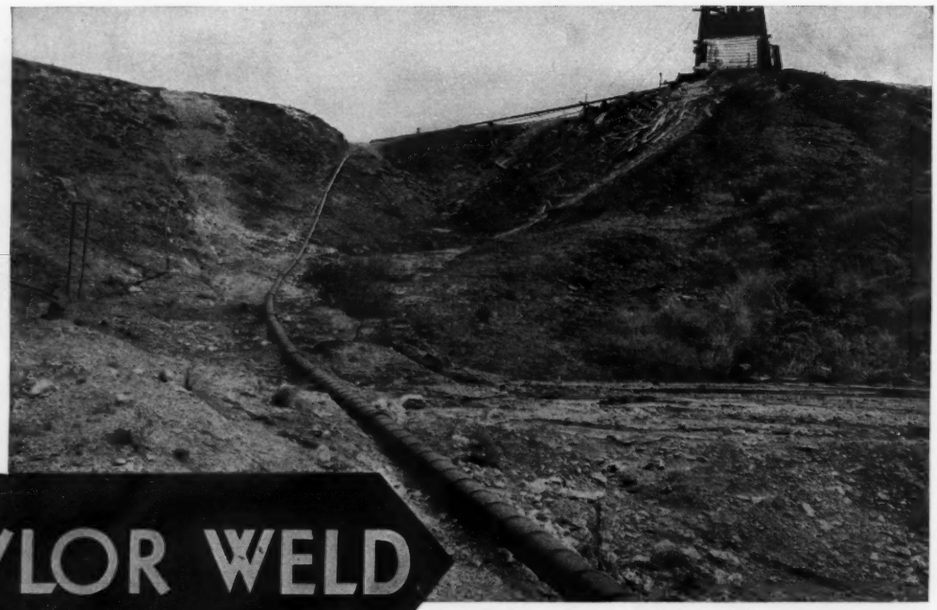
Dismantled and shipped to the Elwood field where it was re-designed to cope effectively with different conditions, then completely re-erected and placed in successful operation --- the plant pictured here. This difficult job was executed by Fluor engineers. Just an example . . . . Only one of many, yet illustrating clearly the complete proficiency of Fluor engineers. ¶ Organizations whose engineering departments have been depleted are finding it advantageous to commission Fluor to supervise and complete all types of construction or installation. Instantly they have all of Fluor's forces working for them --- swiftly, accurately, and most economically to the completion of the job. ¶ We should like to confer with you regarding your present and future construction work. We can show you clearly how our services will reduce your expenses.

The FLUOR CORPORATION, LTD.
909 EAST FIFTY-NINTH STREET
LOS ANGELES, CALIFORNIA

11 E. FIFTH AVENUE TULSA, OKLA. | 30 CHURCH STREET NEW YORK, N. Y. | MAGNOLIA BLDG. DALLAS, TEX. | 503 FAIRFAX BLDG. KANSAS CITY, MO.

September, 1931, Volume VII, Number 9, Western Gas is published by Western Business Papers, Inc., at 124 West Fourth Street, Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 2 years, $3.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, under the Act of March 3, 1879.

8-inch, 30 foot lengths of Naylor SPIRALWELD Pipe laid in Texas. Note flexibility of the pipe.



The NAYLOR WELD

The principal function of the Naylor WELD is to seal the pipe leak tight. The Naylor spiral lock-seam truss relieves the WELD of expansion and contraction strains. This is an exclusive and distinctive property found only in Naylor SPIRALWELD Pipe.

In addition to its distinctive WELD, Naylor SPIRALWELD Pipe is also STRONG...LIGHT...and DURABLE. Use it on your air, water, gas and oil lines, because its many outstanding advantages make it a sound, profitable pipe investment.

TRADE MARK NAYLORPIPE

PIPE CARRIED IN STOCK AT CHICAGO, HOUSTON AND LOS ANGELES

NAYLOR PIPE COMPANY

Main Office & Plant, 1230 East 92nd Street, Chicago

SALES OFFICES

NEW YORK
3116 Chrysler Building

PHILADELPHIA
Witherspoon Building

TULSA
507 Philtower Building

HOUSTON
2301 Commerce Street

DALLAS: 305 Magnolia Building

LOS ANGELES: Champion & Barber, Inc., 576 Subway Terminal Building., Exclusive Distributors: California, Nevada and Arizona

MONTREAL, CANADA: Mechanical Equipment Company, 660 St. Catherine St., West

VANCOUVER, B. C.: Gordon & Belyea, Ltd., 101 Powell Street

MARACAIBO, VENEZUELA: Patrick H. Heeney, Apartado 298

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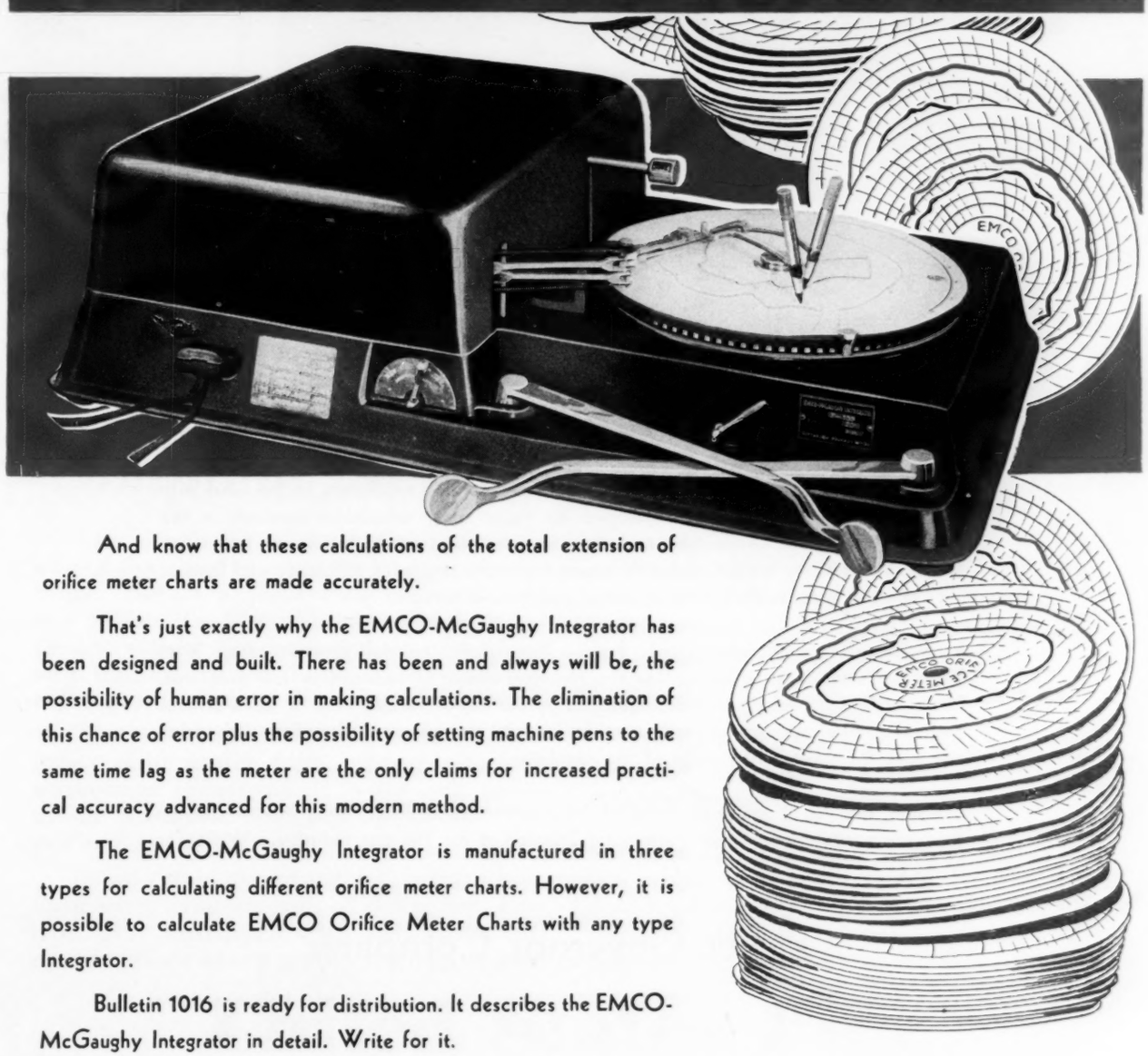
CALCULATE 300 CHARTS A DAY WITH THE . . . EMCO-McGAUGHY INTEGRATOR



And know that these calculations of the total extension of orifice meter charts are made accurately.

That's just exactly why the EMCO-McGaughy Integrator has been designed and built. There has been and always will be, the possibility of human error in making calculations. The elimination of this chance of error plus the possibility of setting machine pens to the same time lag as the meter are the only claims for increased practical accuracy advanced for this modern method.

The EMCO-McGaughy Integrator is manufactured in three types for calculating different orifice meter charts. However, it is possible to calculate EMCO Orifice Meter Charts with any type Integrator.

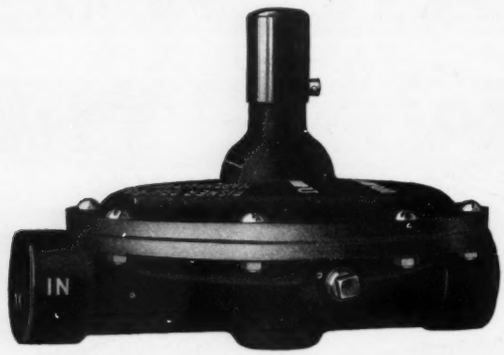
Bulletin 1016 is ready for distribution. It describes the EMCO-McGaughy Integrator in detail. Write for it.

PITTSBURGH EQUITABLE METER COMPANY

Main Office and Factories—Pittsburgh, Pa.

NEW YORK TULSA SALT LAKE CITY LOS ANGELES COLUMBIA CHICAGO
DAVENPORT DALLAS SEATTLE HOUSTON KANSAS CITY

BETTER REGULATION....



...because Fisher House Service Regulators are "Custom-Built"

FISHER House Service Regulators are always made for the particular kind of gas with which they are to be used—whether natural gas, butane, manufactured gas, propane or other gas. The regulator that gives the most satisfactory results with one kind of gas is not the best suited for another kind. Consequently, Fisher has no "stock" regulator that is recommended regardless of the service.

Special valve and diaphragm materials for house service regulators to be used with each kind of gas have been developed by Fisher after exhaustive research in the Fisher Experimental Laboratory and field investigations made by Fisher Engineers. The fact that these special materials assure maximum regulator efficiency and longest life has been repeatedly proved in actual commercial service.

In the building of all Fisher House Service Regulators, the high pressure range is an important consideration as well as the required range of reduced or low pressures. Fisher assures the most sensitive regulation by the use of various sizes of valve orifices and adjustment springs—a result that no "stock" combination of orifice and spring can give throughout the range of the regulator.

Catalog No. G-31 contains detailed information regarding Fisher House Service Regulators and other Fisher Automatic Specialties for the gas industry. Write for a copy.

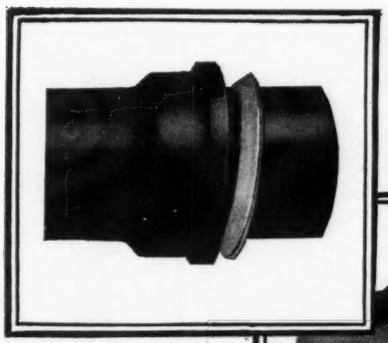
Fisher Governor Company

2400 Fisher Bldg. Marshalltown, Iowa

FOR FISHER FIFTY YEARS

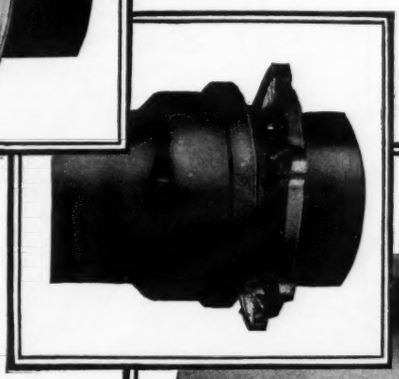
THE MARK OF SCIENTIFIC FLUID CONTROL

One



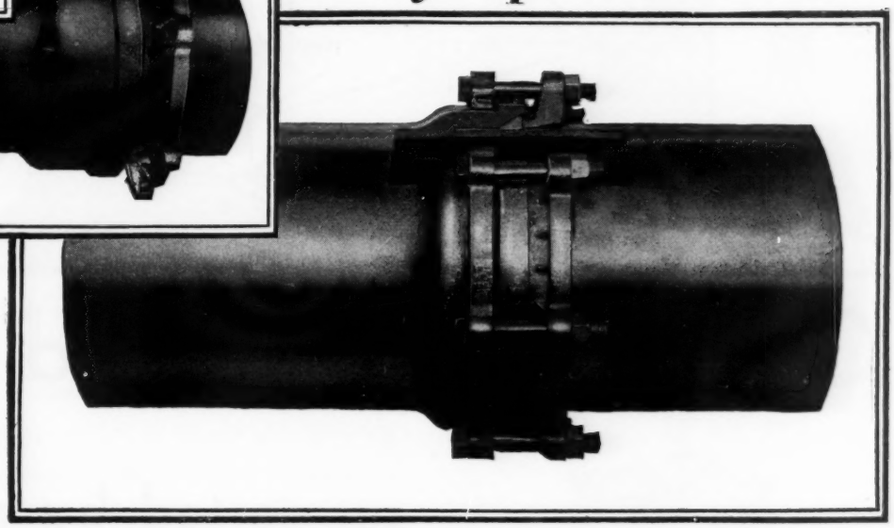
First the gasket is slipped within the bell.

Two



Next the follower ring pushes the gasket home.

Three easy operations . . .



And now the clamp ring is bolted in place and the joint is completed.

—complete the gas-tight Anthony Joint

The simplicity of the Anthony Joint is one of the chief reasons for its wide acceptance. Here's a joint that requires only *one* gasket. To assemble, merely place the gasket within the bell, put on the rings, and tighten up the bolts—that's all. No calking, no pouring. No delay of any kind.

The Anthony Joint will remain absolutely tight under high pressures too. In numerous locations, it is serving today under pressures ranging up to 200 lbs. per square inch.

In addition, the Anthony Joint allows for a surprising amount of deflection. Cast iron pipe equipped with this joint will readily follow heavy grades in steep or rolling country. Engineers have found this joint to be ideal for bridge installations too as it is unaffected by continuous vibration.

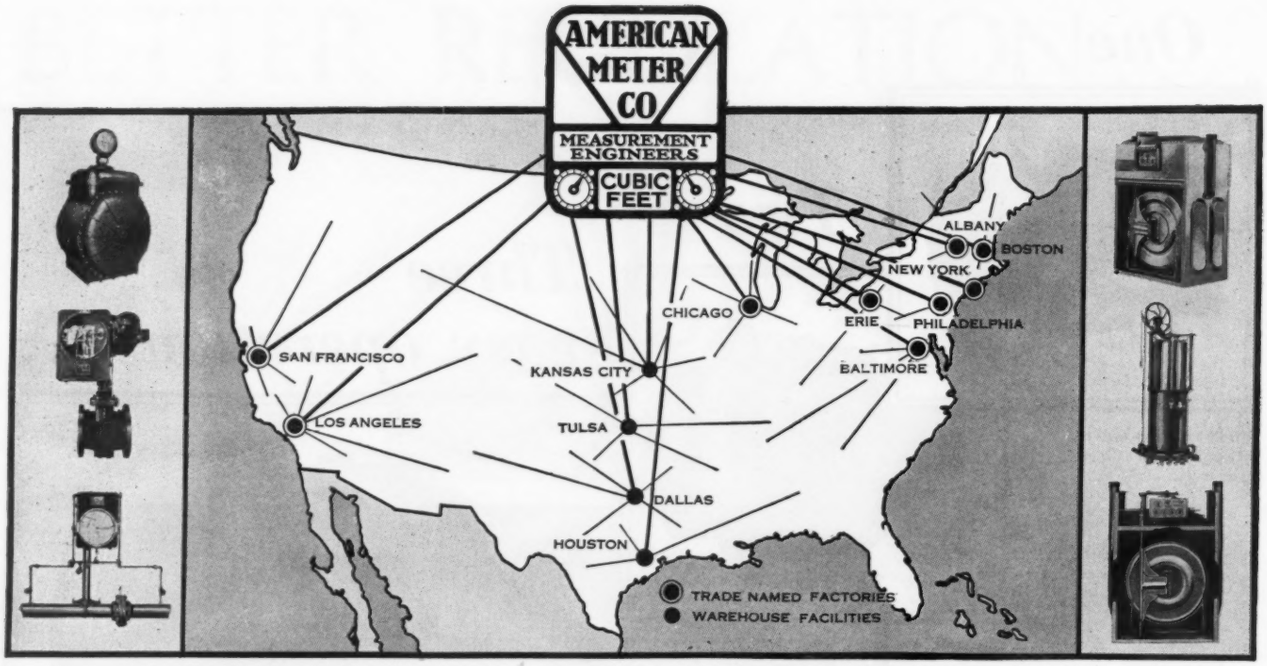
The Anthony Joint is offered in either deLavaud centrifugally cast pipe or in pit cast pipe and fittings. All rings, bolts and gaskets are interchangeable.

Of special interest is the fact that Anthony Joint bends, tees and other fittings can also be used with plain end pipe. These Anthony Joint fittings enable the contractor to make sure of the tightness of the important terminal points of his line. Ask us for complete information regarding the many advantages which this new joint offers.

United States Pipe and Foundry Co., Burlington, N.J.

Our pipe bears the "Q-Check" trademark of The Cast Iron Pipe Research Association

Sales Offices: New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles



Conveniently Located Factories

American Meter Company
New York
Established 1836

American Meter Company
Chicago
Established 1896

John J. Griffin & Company
Philadelphia
Established 1859

Helme & McIlhenny
Philadelphia
Established 1848

supported by nation-wide experience and facilities

Ninety-four years ago — shortly after the first gas plant was founded in this country — American Meter Company opened its first factory. Today American Meter Company supplies the gas industry from ten trade-named factories strategically located from coast to coast.

Each factory is an integral part of a comprehensive manufacturing organization, supervised by trained engineers. Each American Meter is made to the highest standards of accurate measurement and economical service.

Old Types Improved
New Types Developed

A pioneer in the manufacture of gas meters, American Meter Company is still pioneering in the development of improved gas measuring and testing apparatus.

With increasing experiment and intensive research, the engineers of American Meter Company are constantly improving established meters, and developing new equipment to meet new requirements.

Many Branches Provide Intensive Local Service

The geographical distribution of American Meter Company branches assures quick delivery and prompt engineering and shop service. It also permits an intensive knowledge of local conditions and their specific requirements.

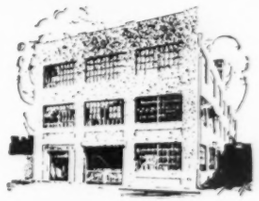
Whenever you have a meter problem call in an American Meter Company representative. He will gladly bring to its solution a personal interest, supported by the experience of extensive laboratory experiment and of gas measurement practically applied in every part of the country.

"Gas Measurement Engineering," a periodic publication of American Meter Company will be of interest to you—also the complete index to this Company's other printed information. We will be pleased to place your name on our mailing list.

D. McDonald & Company
Albany
Established 1855

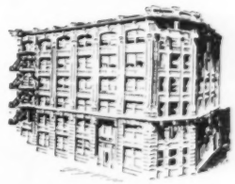
Maryland Meter Works
Baltimore
Established 1866

Metric Metal Works
Erie, Pa.
Established 1888



Pacific Meter Works
Los Angeles
Established 1901

Pacific Meter Works
San Francisco
Established 1901



Nathaniel Tufts Meter Works
Boston
Established 1860

AMERICAN METER CO
MEASUREMENT ENGINEERS
CUBIC FEET

AMERICAN METER COMPANY
Incorporated

General Offices: 105 West 40th Street, New York, New York . . . . Established 1836

THE WORLD'S LARGEST MANUFACTURERS OF GAS METERS AND ALLIED APPARATUS

SALES ALBANY · BALTIMORE · BOSTON · CHICAGO · DALLAS · DENVER · ERIE · KANSAS CITY
SERVICE LOS ANGELES · NEW YORK · PHILADELPHIA · PITTSBURGH · SAN FRANCISCO · TULSA

14 Ft. per Minute in This Tiny Digging Package

Weighs only 7500 lbs.
Measures only 48" wide
Cuts 3'x5" to 3'x8" ditch
Reversible Spoil Conveyor
Throttling Governor
35 h. p. High Compression Engine
$2800 f. o. b. Aurora

So narrow that it can go through wherever two men can walk abreast —so light that it handles as easily as an automobile—so sturdy, so powerful that it clips off as high as 14 feet per minute and literally walks through the toughest digging.

That is the story on the New Barber-Greene Service Special which is revolutionizing certain types of ditching. But that is only a small part of the story.

Digging 5 to 8 inches wide, this new Barber-Greene disturbs less ground. There is less soil, sod or pavement to replace. Backfilling costs go down as sharply as digging costs.

Weighing but 7500 pounds, the Service Special has more horsepower per pound, and puts more actual horse-power into digging —on less gasoline and oil.

And the price is as sensational as the performance: only $2800 f.o.b. Aurora.

Ask for details today if you do any town, city or narrow trench work.

BARBER GREENE
SPECIALIZING IN INVENTING FASTER AND CHEAPER MACHINES AND METHODS

BARBER-GREENE CO. **712 W. Park Ave., Aurora, Illinois**

Bucket Loaders
Coal Loaders
Snow Loaders
Trailers
Loaders with Weighing and Batching Hoppers
Loaders with Vibrating and Grizzly Screens
Coal and Coke Car Unloaders
Permanent Belt Conveyors
Portable Flight Conveyors
Standard Gas and Water Ditchers
Pipe Line Special Ditchers
Belt Car Unloaders
Portable Belt Conveyors
Self-Propelled Flight Conveyors
Utility Special Ditchers
Service Special Ditchers

In 1854
Nashville laid Cast Iron gas mains which are still in service

SEVEN years before the Civil War, cast iron gas mains were installed in Nashville. Trolley cars, taxi cabs and motor trucks were then unheard of. Yet those cast iron mains, laid without benefit of the engineering precautions of today against electrolysis, traffic shock and vibration, are still down and rendering satisfactory service. Such testimony as this to the enduring quality of cast iron pipe is not exceptional. In more than 70 per cent of the 44 largest cities in America, *original* cast iron gas mains are still in use.

Evidence that cast iron has unequalled longevity engineers no longer require. The fact is conceded. But the ability of cast iron pipe to cope with unforeseen stresses and conditions has also been demonstrated by the still-in-service records of 70, 80, 90 and 100-year-old mains. To realize this fully, contrast the radically changed conditions in modern cities with those in stage coach days — the complex maze of underground structures, dynamic traffic shocks, vibration and electrolysis.

Today, gas distribution engineers are provided with a still better product in modern mains of cast iron. With higher quality, greater uniformity of quality, and the development of efficient mechanical joints for high-pressure distribution, cast iron pipe meets the modern demands of gas distribution on a progressive plane of service. For information regarding the advantages of cast iron pipe for gas distribution service, or for water and sewer mains, address Thomas F. Wolfe, Research Engineer, The Cast Iron Pipe Research Association, 309 Peoples Gas Bldg., Chicago, Ill.

Efficient mechanical joints for cast iron gas mains are now in use and obtainable for high-pressure gas distribution.

Cast iron pipe bearing the "Q-check" trademark is obtainable from the following leading pipe founders: Alabama Pipe Company, Anniston, Ala.; American Cast Iron Pipe Company, Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Ave., Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe and Foundry Company, Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Pipe and Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Corporation, 11 Broadway, New York.

Reg. Trade Mark

CAST Q IRON

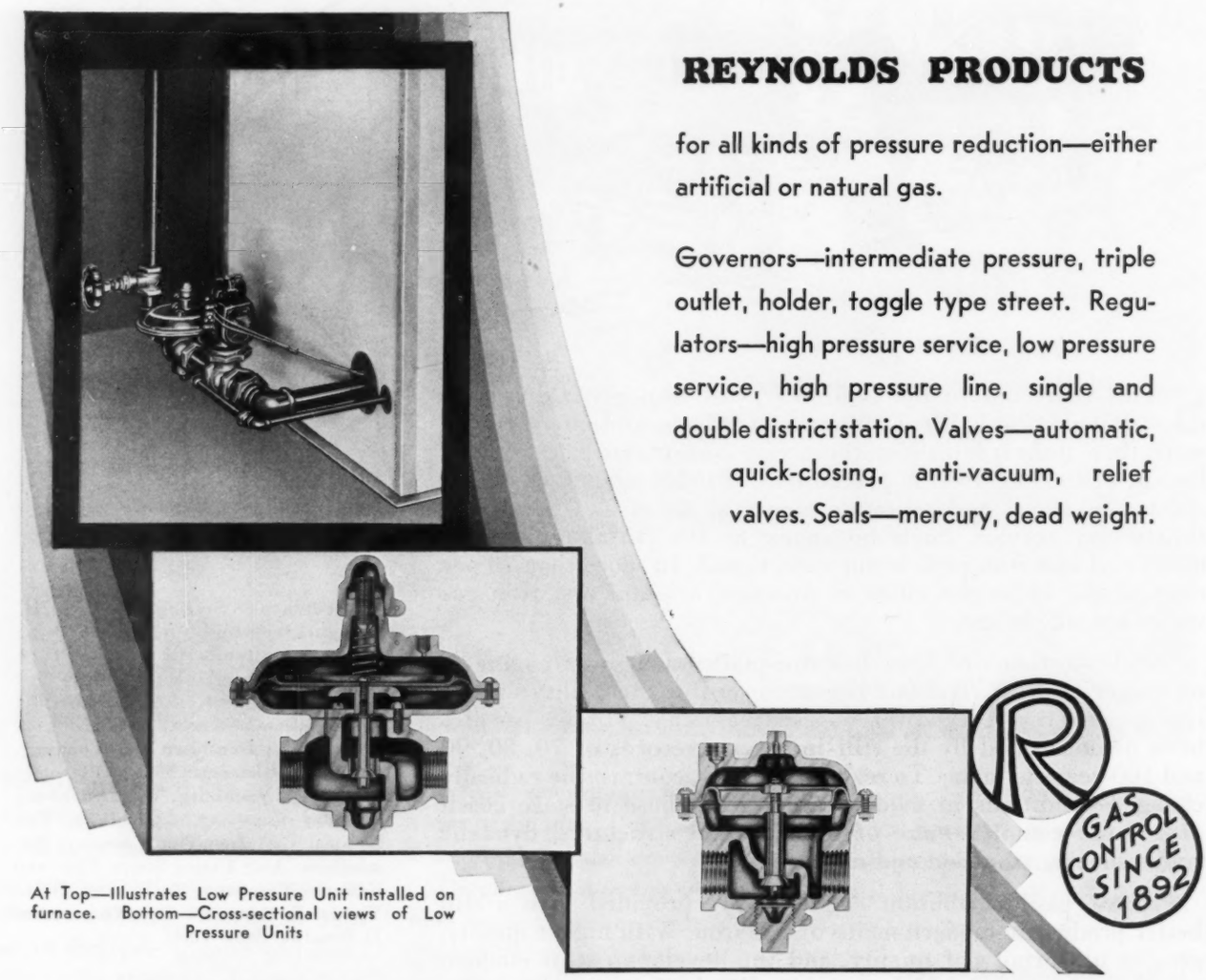
The "Q-check" symbol shown above is the registered trademark of The Cast Iron Pipe Research Association.

CAST IRON PIPE

Low Pressure Control

IMMEDIATE - ACCURATE

Reynolds Low Pressure Regulators insure consistent delivery pressure for combustion purposes regardless of varying line pressure and uneven volumes. These Low Pressure Regulators, like all of the Reynolds units, are designed and built to handle specific jobs 100% of the time. Let the Reynolds Engineering Staff aid in solving your gas control problems.



At Top—Illustrates Low Pressure Unit installed on furnace. Bottom—Cross-sectional views of Low Pressure Units

REYNOLDS PRODUCTS

for all kinds of pressure reduction—either artificial or natural gas.

Governors—intermediate pressure, triple outlet, holder, toggle type street. Regulators—high pressure service, low pressure service, high pressure line, single and double district station. Valves—automatic, quick-closing, anti-vacuum, relief valves. Seals—mercury, dead weight.

GAS CONTROL SINCE 1892

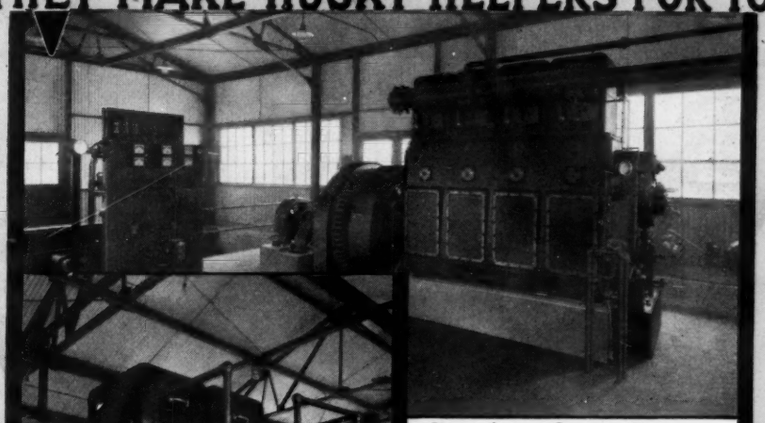
REYNOLDS GAS REGULATOR COMPANY
ANDERSON, INDIANA, U. S. A.

BRANCH OFFICES { 422 DWIGHT BUILDING, KANSAS CITY, MISSOURI
2ND UNIT SANTA FE BUILDING, DALLAS, TEXAS

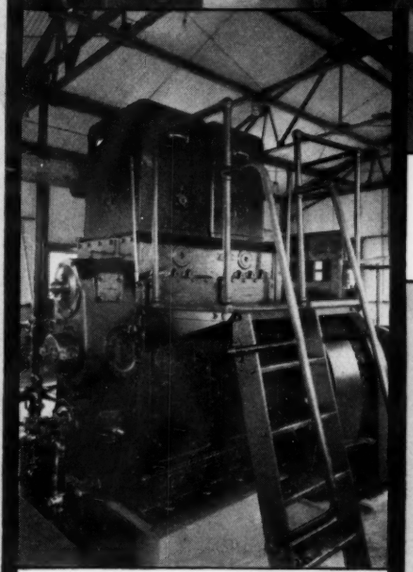
REPRESENTATIVES { EASTERN SERVICE CO., BOSTON, MASSACHUSETTS
F. E. NEWBERRY, AVON, NEW JERSEY

Verticals with Brawn

THEY MAKE HUSKY HELPERS FOR YOUR BIG MAIN ENGINES



One of two Cooper-Bessemer 200 B. H. P. Vertical gas engines direct-driving 156 K. V. A. generators in Sterlington station of United Gas Company. Kline Spur, La.



Cooper-Bessemer 90 B. H. P. Vertical gas engine direct-driving 75 K. V. A. generator in Cole Bruni station of United Gas Company at Bruni, Texas.

A large-diameter die-forged crankshaft is just ONE of the strong points of the 11½x14" convertible vertical engine. Every part subject to heat, friction, stress and strain is heavily fortified against trouble. It is wise to choose auxiliary power units with the same care you do main compressor units. Thoroughly investigate these compact, enclosed vertical engines for dependable compressor station service.

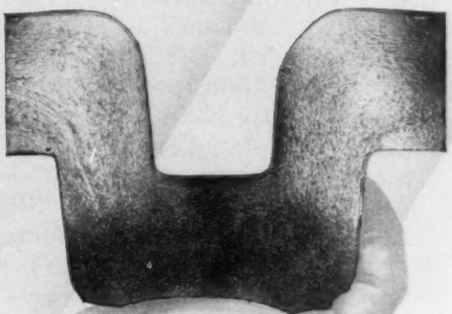
The Cooper-Bessemer Corporation

Mount Vernon, Ohio — Grove City, Pa.

201 East First Street, Tulsa, Oklahoma — 1313 Magnolia Building, Dallas, Texas — 640 East 61st Street, Los Angeles, California

Suite No. 301, 25 W. 43rd St., New York, N. Y.

BRANCH OFFICES IN ALL PRINCIPAL OIL FIELDS



Like the sinews of a mighty arm, the fiber in this die-forged crankshaft is directed to resist stresses. Cross-section photo shows continuous flow lines.

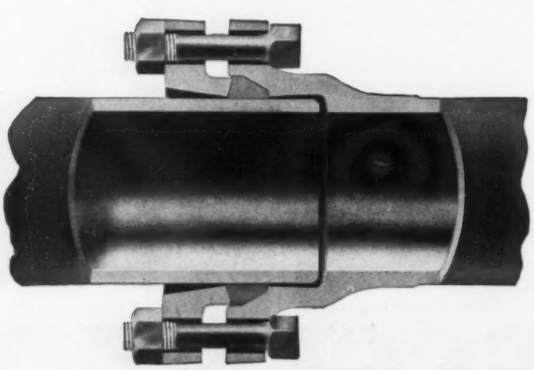
COOPER-BESSEMER

DOUBLEX SIMPLEX CAST IRON PIPE

is *Quickly* EASILY ECONOMICALLY LAID

Connecting up Doublex Simplex Pipe on trench side preparatory to "snaking in" for natural gas in Ohio.

DUE to the long lengths in which it is furnished (16 feet) and the unique design of the joint, Doublex Simplex Pipe can be quickly, economically laid and the joint completed using one tool—a ratchet wrench. When the plain end of a Doublex Simplex Pipe is socketed into the flange end (see cross-section diagram) a triangular stuffing box is formed with a shoulder against which a ring gasket is compressed by the "loose flange" as the bolts are tightened. The gasket naturally wedges into the stuffing box of the joint and its bulk eliminates rigidity. Deflection in any direction is automatically permitted, and the deep socket allows plenty of room for longitudinal expansion or contraction of the line. A new, comprehensive illustrated catalog describing Doublex Simplex Pipe will be sent you *free* on request. Address Acipco office nearest you.



DOUBLEX SIMPLEX JOINT
withstands high pressures and remains bottle-tight under repeated deflections.

AMERICAN CAST IRON PIPE COMPANY

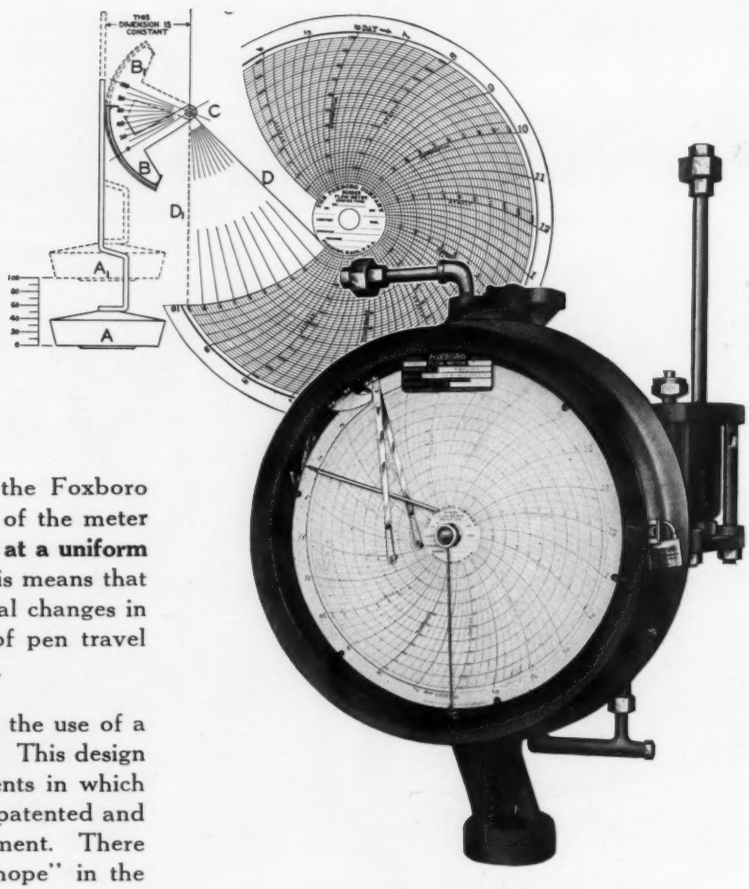
BIRMINGHAM, ALA.

SAN FRANCISCO
DALLAS
NEW YORK CITY
CHICAGO
SEATTLE
MINNEAPOLIS
KANSAS CITY
LOS ANGELES
CLEVELAND

319C

For Line after Line
DRESSER
COUPLINGS Dominate!
The major lines for 1931 . . . Dresser Couplings are coupling them. Leaders in the Gas Industry recognize Dressers as the best means of joining pipe. Flexible under every twist or shift of the line; permanently tight as long as the pipe stays in service.
S. R. DRESSER MANUFACTURING COMPANY, BRADFORD, PA.

Meter Maintenance Costs /



UNIFORM straight line motion gives the Foxboro Meter **inbuilt calibration.** All parts of the meter from the mercury to the pen **change at a uniform rate** so that results are always uniform. This means that anywhere within the range of the meter equal changes in differential pressure cause equal distances of pen travel and every action between the two is uniform.

The Straight Line Movement results from the use of a segmental lever in place of a common lever. This design was the culmination of exhaustive experiments in which several types of movements were designed, patented and discarded—including a multiple lever movement. There is not the slightest bit of guess work or "hope" in the design of the Foxboro meter movement.

It is not necessary to send a Foxboro Meter to the shop for calibration; set the pen at zero and it is accurate throughout the scale.

Records show that Foxboro Meters have by far the lowest maintenance cost of any meter. Write for complete information.

The Time To Lick Maintenance Cost Is When You PURCHASE

FOXBORO
REG. U. S. PAT. OFF.
THE COMPASS OF INDUSTRY

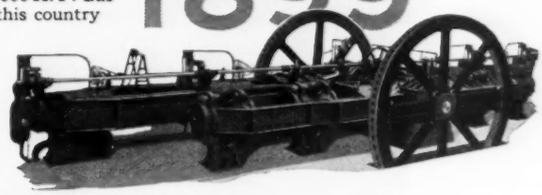
THE FOXBORO COMPANY
Neponset Ave., Foxboro, Mass., U.S.A.
Agents for Robinson Patented Orifice Flange Fittings
28 North Guthrie Ave., Tulsa, Okla. Magnolia Building, Dallas, Tex.
J. E. Treacy, Strada Golesti No. 9, Ploesti, Roumania
New York Chicago Boston Philadelphia Pittsburgh
Cleveland Rochester, N. Y. Atlanta Los Angeles
San Francisco Salt Lake City Portland, Ore. Detroit

Instruments for Controlling, Recording and Indicating Temperature, Flow, Humidity and Pressure

TRANSIT Engineering has always led

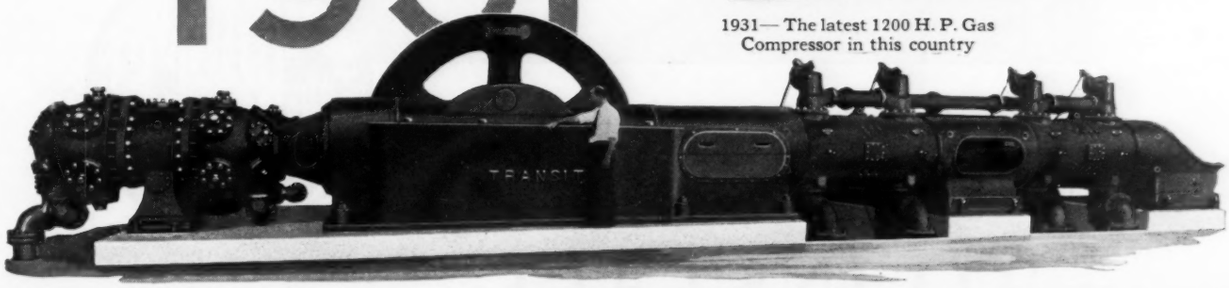
1899— The first 1000 H. P. Gas Compressor in this country

1899



1931

1931— The latest 1200 H. P. Gas Compressor in this country



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The design and production of 1200 HP Gas Engine Compressors demands keen, experienced engineering talent.

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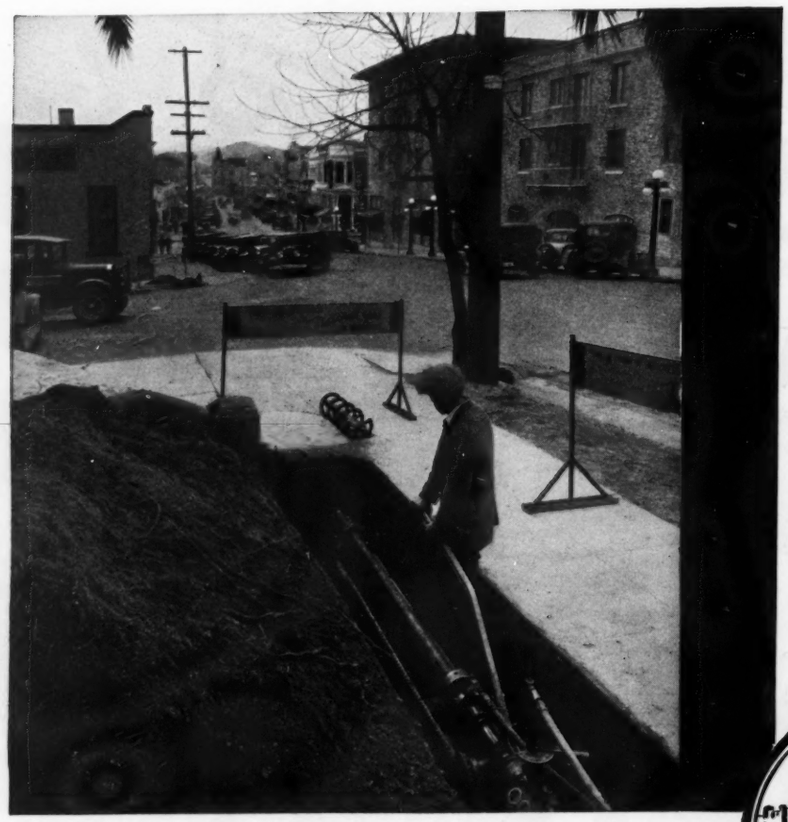
That the original 1000 HP Gas Engine Compressor, now 33 years old, is still in daily operation and giving good service is part of the picture; but the principal character is the new 1200 HP Gas Engine Compressor designed and manufactured upon the accumulated experience of designing and building 1200 gas engines ranging in size up to 1000 HP.

We realize that a compressor of this size is interesting to but few gas men. We cordially invite such men to visit our plant and inspect this engine on test.

NATIONAL TRANSIT PUMP & MACHINE CO OIL CITY, PENNA.



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WESTERN GAS

"Reg. U. S. Pat. Off."

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THE PACIFIC COAST GAS ASSOCIATION

AND

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R. E. Fisher, President, Pacific Coast Gas Association, will direct the order of business at San Francisco, August 31-September 5, when Pacific Coast gas men meet in their 38th annual sessions.

September, 1931

WESTERN GAS

Vol. VII, No. 9

"Reg. U. S. Pat. Off."

A Monthly Journal of the Gas and Gas Appliance Industries in *Western America*

Review of the Month

Testing Anti-Sales Legislation in Kansas

A HEARTENING sign for utility sales departments comes to light in Kansas where enforcement of the recently adopted anti-merchandising statute is being restrained by court decree, pending a test of the measure's constitutionality. Prominent legal opinion in the state, including that of the Kansas Public Service Commission legal department, holds the law invalid as class legislation and on other counts.

There is no good reason why utilities in those few areas affected by anti-merchandising legislation should take a passive stand in the issue. In these sections the utilities' first task is to establish their legal right to merchandise . . . the next task, and a continual one, to keep before their customers the many advantages which come from utility selling.

Published elsewhere in this issue, the constructive platform for harmonious gas company-dealer relations recently set up by the A. G. A. Committee on Allied Trades, is commended to the reader's attention.

Perennial Oil Troubles Take a New Turn

Oil industry difficulties have been big news for the month past, as Oklahoma, Texas and Kansas resorted to spectacular methods to effect a curb in production. Overproduction is an old story to oil men . . . explained by inability to get unanimous cooperation for proration or other means to the same end. Both domestic and industrial gas markets have felt the ill effects of low oil price levels resulting from disorderly production, and improvement in this market condition will bring relief in more than one related industry. During the month past state governors in Oklahoma and Texas have forcibly shut in production, and the Public Service Commission of Kansas has shut in major areas in that state. Such emergency measures may result beneficially for the time being, but an orderly production program conducted by the industry itself should be invoked to speedily dispel the shadow of martial law—and all that it implies.

Gas Construction Still On the Up-Curve

New gas line undertakings reported during the past month give a strong tone to construction prospects for coming months. The second Texas-Chicago line, planned from the beginning as a unit of the Natural Gas Co. of America enterprise, appears to be definitely in sight for construction before the summer of 1932, probably as a 30-inch carrier.

Survey work is now proceeding for a 20-inch extension north from the Chicago area to Milwaukee, reported to involve a 3 million dollar cost.

Bringing to Saskatchewan centers another prospect for natural gas, the Power Corp. of Canada, Ltd., now projects a 4 million dollar line from the Bowdoin field of Montana, with franchises being sought in Regina and other points along the contemplated route.

Laramie, Wyoming, is due for natural gas, if the project of C. E. Bivens for a line from the Baggs field, over 100 miles distant, is consummated. Permit to lay the line has already been secured.

Natural gas turn-ons are due in several score of new towns, as lines built during the summer reach their market termini. Butte, Helena, Anaconda and Deer Lodge will get natural gas September 7 from Montana Power's 10 million dollar line, now undergoing test. The same company turned gas into its line from Dry Creek to Bozeman and Livingston, early in August.

Running from the Pecos Valley field of west Texas, 120 miles of 8-inch line began service to Fort Stockton and adjacent towns, starting August 24.

Panhandle Eastern Pipe Line Co. has now crossed Illinois, into Indiana, with its major carrier originating in Texas fields, 850 miles of line now being under ground. Columbia Gas & Electric interests are bringing an extension from Muncie, Ind., to link with the Panhandle-Eastern main line at a point near the Indiana-Illinois state border, thus making Texas gas available to eastern users through Columbia's existing system.

Half-Year Facts on Sales and Revenues

Half-year statistical returns available from the American Gas Association late in August give the industry facts, in place of over-pessimistic or over-hopeful forecasts, on the trend of 1931 sales and revenues. Manufactured and natural gas sales declined 7.1 per cent, revenues only 3.7 per cent, says the A. G. A., compared to the first six months of 1930.

Program Particulars for the 38th Pacific Coast Convention and a unique Natural Gas Exposition

GAS men of the Pacific Slope area are heading toward San Francisco, as this is written, assembling for the 38th convention of the Pacific Coast Gas Association. This year they expect something different—a fillip to the ordinary convention offering . . . in the form of a Natural Gas Exposition, put on in ambitious style for the primary attraction of natural gas users in the Northern California area—but giving opportunity for the industry to inspect the latest exhibits of several score progressive appliance and equipment manufacturers. The Pacific Gas and Electric Co. is host to the convention, and has shouldered the responsibility for conducting the Natural Gas Exposition.

Both convention sessions and the Exposition will have as their background the splendid facilities of the Civic Auditorium, with registration opening the morning of Monday, August 31. The complete program of general and sectional meetings appears below, promising inspiration and technical advancement to those of the industry who are in attendance.

Convention entertainment has been in capable hands, the full program of social features including several luncheon, tea and bridge events for convention ladies; informal dinner and dancing each evening, and a boat ride on San Francisco Bay for both men and women. In keeping with Association tradition, the Annual Banquet will be a highlight, staged Friday evening, September 4, at the Palace Hotel, as the convention finale, though the Exposition will be open through Saturday evening.

San Francisco will entertain the P. C. G. A. Annual Convention for the first time since 1915.

Friday afternoon will see Association golfers in competition at the Lake Merced Golf and Country Club, when the annual tournament is scheduled.

General arrangements for the 38th Convention have been in charge of an efficient Executive Committee, made up of the following:

John P. Coghlan, *General Chairman;* Henry Bostwick, *Registration Chairman;* Van E. Britton, *Entertainment Chairman;* H. M. Crawford, *Exhibition Chairman;* G. P. Egleston, *Director of Exhibits;* John H. Hunt, *Golf Chairman;* A. C. Joy, *Publicity Director;* Harry C. Ross, *Program Manager;* Elliott Taylor, *Editor "Balloon Juice";* E. C. Wood, *Transportation Chairman;* W. S. Yard, *Hotel Accommodations;* Mrs. R. E. Fisher, *Hostess.*

In the detailed program presented below, those convention reports which are preceded by an asterisk may be referred to in the August issue of *Western Gas.*

GENERAL SESSIONS

MONDAY, AUGUST 31

9:00 A. M.

Registration Opens—Lobby, Civic Auditorium.

12:15 P. M.

Opening Luncheon—Larkin Hall, Civic Auditorium. Chairman, P. M. Downing, Vice-President and General Manager, Pacific Gas and Electric Co.

Speakers:

The Company's Objective—A. F. Hockenbeamer, President, Pacific Gas and Electric Co.

The Association's Objective—R. E. Fisher, President, Pacific Coast Gas Association.

The Exhibitors' Objective—C. B. Babcock, President, C. B. Babcock Co.

Dedication of Exposition by Hon. Angelo Rossi, Mayor of San Francisco.

2:00 P. M.

Preview of Cooperative Natural Gas Exposition—The Natural Gas Exposition will open to the public at 7:00 P.M. Monday, August 31, and be open daily thereafter from 1:30 P.M. to 10:00 P.M. It will close at 10:00 P.M. Saturday, September 5.

TUESDAY, SEPTEMBER 1

9:30 A. M. Polk Hall, Civic Auditorium

Address of Welcome—A. F. Hockenbeamer, President, Pacific Gas and Electric Co.

President's Address—R. E. Fisher, President, Pacific Coast Gas Association.

Report of Board of Directors—Clifford Johnstone, Managing Director, Pacific Coast Gas Association.

Election of Officers.

Address: "Public Utility Merchandising"—LeRoy M. Edwards, General Counsel, Southern Counties Gas Co.

Address: "The Greatest Asset of a Public Utility"—Dr. H. R. Halsey, J. David Houser and Associates, New York City.

WEDNESDAY, SEPTEMBER 2

2:00 P. M. Polk Hall, Civic Auditorium

(Under Auspices of Publicity and Advertising Section)

Address of Chairman—W. D. Thurber, Advertising Manager, Southern Counties Gas Co.

Address: "Why Advertise by Radio"—Harry F. Anderson, Sales Manager, National Broadcasting Company, Inc.

Address: "Why Advertise in Newspapers"—Elliott C. Hensel, Director of Advertising, Los Angeles Illustrated Daily News.

Report: "Advertising Policies, Practices and Costs"—F. M. Banks, Chairman, Southern California Gas Company.

Report: "Evaluation of Advertising"—H. L. Masser, Chairman, Los Angeles Gas and Electric Corp.

Report: "Institutional Advertising"—Jas. F. Pollard, Chairman, Seattle Gas Co.

Address: "And They Do Say"—D. L. Scott, Manager Public Relations, Los Angeles Gas and Electric Corp.

THURSDAY, SEPTEMBER 3

9:30 A. M. Polk Hall, Civic Auditorium

The Woman's Place in the Public Utility Industry—A Public Speaking Contest for women, held under the auspices of the Women's Committee, Public Relations Section.

Address: "Home Service, Its Activities and Results"—Miss Jessie McQueen, Home Service Counsellor, American Gas Association.

Address: "Taxation of Public Utilities"—A. A. Smith, Secretary and General Attorney, Eastern Oregon Light & Power Co.

Report of Committee on Cooperative Advertising—J. Chas. Jordan, Chairman, Pacific Gas and Electric Co.

Address: "The March in Retrogression"—Geo. L. Myers, Assistant to the President, Portland Gas & Coke Co.

2:00 P. M. Polk Hall, Civic Auditorium

(Under Auspices of the Public Relations Section)

Government Ownership of Public Utilities—A Public Speaking Contest for men.

Report: "Employees Relations With the Public"—E. M. Seel, Chairman, Pacific Gas and Electric Co.

The Consumer Is King—Presentation of Prize Winning Essay by W. A. Hayward, Gas Appliance Inspector, San Diego Consolidated Gas and Electric Co.

Customers Relations Conference—Under auspices of Committee on Relations with Customers, O. L. Moore, Chairman, Los Angeles Gas and Electric Corp., presiding.

FRIDAY, SEPTEMBER 4

9:30 A. M. Polk Hall, Civic Auditorium

"I Am the Company"—Playlet submitted in the Public Relations Stunts Contest in competition for the Addison B. Day Trophy.

Address: "Some Advertising Gold Bricks"—Don Francisco, Vice President, Lord & Thomas & Logan.

Address: "Feeling the Pulse of the Buying Public"—Reginald Biggs, Sales Manager, The Emporium, San Francisco.

Resolutions.

*Printed in August Number of *Western Gas.*

ACCOUNTING SECTION

TUESDAY

2:00 P. M. Room 1, Main Floor, Civic Auditorium, Polk Street End.

Address of Chairman—R. A. Hornby, Executive Engineer, Pacific Lighting Corp.

**Special Problems in Customers' Accounting*—E. R. Merrill, Chairman, Portland Gas & Coke Co.

Fixed Capital Records—R. W. Baily, Chairman, Southern California Gas Co.

**Haulage Accounting*—Geo. F. Mackenzie, Chairman, Portland Gas & Coke Co.

Adjourn to Study Machine Billing Exhibit.

WEDNESDAY

9:30 A. M. Room 1, Main Floor, Civic Auditorium, Polk Street End.

**Division Purchases and Disbursements*—J. Q. Ewing, Southern California Gas Co.

**A Study of a Machine Stores Accounting System*—R. M. Nance, Seattle Gas Co.

**Classification of Accounts for Natural Gas Companies*—E. N. Simmons, Chairman, Los Angeles Gas and Electric Corp.

**Establishment of Customers' Credit*—O. L. Moore, Chairman, Los Angeles Gas and Electric Corp.

Destruction and Preservation of Records—A. T. Kelly, Chairman, Pacific Gas and Electric Co.

COMMERCIAL SECTION

WEDNESDAY

9:30 A. M. Polk Hall, Civic Auditorium

Address of Chairman—H. M. Crawford, General Sales Manager, Pacific Gas and Electric Co.

DOMESTIC SALES COMMITTEE REPORTS

F. M. Banks, Chairman, Southern California Gas Co.

Merchandising Campaigns—H. E. Davidson, Southern California Gas Co.

Merchandising Plans and Policies—Pierre Vinet, Coast Counties Gas & Electric Co.

Market Analysis and Survey—A. P. Stryker, Pacific Gas and Electric Co.

Education of Salesmen—Lew Galbraith, Pacific Gas and Electric Co.

Gas Heating Sales Problems—F. U. Naylor, Pacific Gas and Electric Co.

Paper: "Competitive Factors Affecting Gas Sales"—C. W. Gale, Superintendent of Commercial and Industrial Gas Sales Division, Public Service Company of Colorado.

Industrial Sales Committee Report—C. R. Miller, Chairman, Portland Gas & Coke Co.

PUBLIC RELATIONS SECTION

TUESDAY

2:00 P. M. Polk Hall, Civic Auditorium

THE FEMALE OF THE SPECIES

Being a session devoted to the consideration of the relationship of 5000 women employees to the public utilities on the Pacific Coast. Under auspices of the Women's Committee—Chairman, Clarita Scott, Los Angeles Gas and Electric Corp.

Playlet: "Gone Modern"

Written by Miss Isobel Allobach, Southern Counties Gas Co., winner of first prize in Addison B. Day Playlet Contest.

Produced by F. S. Curren and Peggy O'Mahony of Pacific Gas and Electric Co.

Address: "A Revolving Fund of Good Will'—F. J. Schafer, Vice-President in Charge of Manufacture, Distribution and Sales, Southern California Gas Co.

Address: "The Influence of Women on Industry"—Addison B. Day, President and General Manager, Los Angeles Gas and Electric Corp.

Address: "The Employment of Married Women in Gainful Occupations"—Eugene G. McCann, Manager Personnel Department, Pacific Gas and Electric Co.

SYMPOSIUM ON EMPLOYMENT RELATIONS

a. *Women and the 8-Hour Law*—E. Closson Cox, Secretary, Southern Counties Gas Co.

b. *What Concessions to Women Employees?*—Jeanette I. Rees, Assistant Secretary, Southern California Edison Co.

c. *Women and the Wage Scale*—George H. Finley, Editor, *Western Gas.*

Address: "If I Were a Women's Committee Chairman"—W. F. Raber, President, San Diego Consolidated Gas and Electric Co.

Announcement of Winner and Presentation of Prize in Downing Committee Achievement Contest—By P. M. Downing, Vice-President and General Manager, Pacific Gas and Electric Co.

WEDNESDAY

9:30 A. M. Room 8, Civic Auditorium

Report of Executive Committee—Geo. L. Myers, Chairman, Portland Gas & Coke Co.

Report of Women's Committee—Clarita Scott, Chairman, Los Angeles Gas and Electric Corp.

Report of Customer Ownership Committee—E. Closson Cox, Chairman, Southern Counties Gas Co.

Report: "Employees' Relations With the Industry"—B. H. Parkinson, Chairman, Portland Gas & Coke Co.

Report: "Education of Employees"—D. L. Scott, Chairman, Los Angeles Gas and Electric Corp.

TECHNICAL SECTION

TUESDAY

PARALLEL SESSIONS

2:00 P. M. Room 9, 4th Floor, Civic Auditorium

Report of Chairman—W. M. Henderson, Superintendent of Distribution, Los Angeles Gas and Electric Corp.

PRODUCTION COMMITTEE—REVIEW OF REPORTS

N. H. Wardale, Chairman, Portland Gas & Coke Co.

**Plant Fire Protection and Housekeeping*—J. E. Kelly, Chairman, Pacific Gas and Electric Co.

**Corrosion of Gas Plant Equipment*—B. G. Dick, Chairman, Portland Gas & Coke Co.

**Water Gas Developments*—W. R. Alexander, Chairman, Seattle Gas Co.

**Butane for Peak Load Production*—J. A. Harritt, Chairman, San Diego Consolidated Gas and Electric Co.

Effect of Sulphur Dioxide in Stack Gases—M. T. Burton, Chairman, Southern California Gas Co.

**Instruments Used in Gas Manufacturing Plants*—J. K. Lehman, Chairman, Portland Gas & Coke Co.

NATURAL GAS TRANSMISSION COMMITTEE REVIEW OF REPORTS

Elting Henderson, Chairman, Southern California Gas Co.

**Compressor Stations*—S. S. Donaldson, Chairman, Southern California Gas Co.

**Transmission Pipe Lines*—C. W. Beck, Chairman, Los Angeles Gas and Electric Corp.

Large Volume Measurements—A. R. Bailey, Chairman, Coast Counties Gas & Electric Co.

*Printed in August Number of *Western Gas.*

WEDNESDAY

9:30 A. M. Room 9, 4th Floor, Civic Auditorium

DISTRIBUTION COMMITTEE—REVIEW OF REPORTS

D. H. Perkins, Chairman, San Diego Consolidated Gas and Electric Co.

**Distribution Design*—N. L. Hoff, Chairman, Los Angeles Gas and Electric Corp.

**Domestic Meters*—Harold M. Crawford, Chairman, Los Angeles Gas and Electric Corp.

**Construction Equipment and Units of Performance*—C. D. Weiss, Chairman, San Diego Consolidated Gas and Electric Co.

**Governor and Regulator Capacities*—H. S. Harris, Chairman, Los Angeles Gas and Electric Corp.

**Pipe Protection and Soil Corrosion*—Guy Corfield, Chairman, Los Angeles Gas and Electric Corp.

SYMPOSIUM

An Open Forum to Discuss Technical Matters of Current Interest.

NATURAL GAS EXPOSITION

Monday, August 31

12:15 P.M.—Opening Luncheon and Dedication.

7:00 P.M.—Exposition opens to public. Music by Sapiro's Orchestra of 30 pieces. Vocal selections by the Simondet Sextette.

Tuesday, September 1

1:30 P.M.—Babies' Bathing Hour and Lecture on Bathing and Feeding Babies, by Dr. Rena K. Piper of the San Francisco Health Department.

3:00 P.M.—Cooking School conducted by Prudence Penny of the San Francisco Examiner.

2:00-4:00 P.M.—Organ Recital in Main Auditorium.

7:00-10:00 P.M.—Concert by Sapiro's Orchestra and Simondet Sextette.

Wednesday, September 2

1:30 P.M.—Style show of house dresses in Larkin Hall, under direction of Betty Simon. Ten beautiful models will display 80 different garments. Entertainment by orchestra and Trowbridge Trio.

2:00-4:00 P.M.—Organ Recital in Main Auditorium.

3:00-4:00 P.M.—Cooking School conducted by the Home Economics Department of the San Francisco Daily News.

8:00 P.M.—Business Women's Night. Cooking School in Larkin Hall conducted by Ella Lehr of the San Francisco Call-Bulletin. Entertainment by Sapiro's Orchestra and Trowbridge Trio.

Thursday, September 3

1:30 P.M.—Babies' Bathing Hour—Larkin Hall.

2:00-4:00 P.M.—Organ recital in Main Auditorium.

3:00-4:30 P.M.—Cooking School in Larkin Hall conducted by Jane Friendly of the San Francisco Chronicle.

8:00 P.M.—Pajama Parade. Ten beautiful models will display 60 different types of washable pajamas. Entertainment by Sapiro's Orchestra, Simondet Sextette and Pajama Dancing Girls.

Friday, September 4

1:30 P.M.—Style Show in Larkin Hall. Entertainment by Orchestra and Trowbridge Trio.

2:00-4:00 P.M.—Organ Recital in Main Auditorium.

3:00-4:30 P.M.—Cooking School conducted by Ella Lehr of the San Francisco Call-Bulletin.

8:00 P.M.—Improvement Clubs' Night. Entertainment by Sapiro's Orchestra and Simondet Sextette.

Saturday, September 5

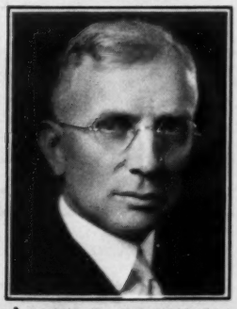
2:00-4:00 P.M.—Organ Recital in Main Auditorium.

3:00-4:30 P.M.—Cooking School in Larkin Hall conducted by San Francisco hotel chefs.

8:00 P.M.—Concert by Sapiro's Orchestra and Simondet Sextette.

38th ANNUAL CONVENTION
Pacific Coast Gas Association

Executive Committee



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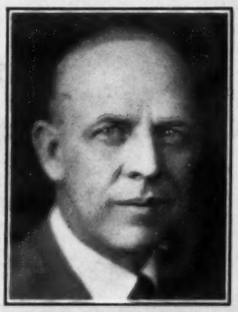
GENERAL CHAIRMAN

MRS. R. E. FISHER
CONVENTION HOSTESS



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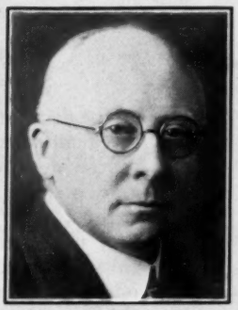
G. P. EGLESTON
DIRECTOR of EXHIBITS



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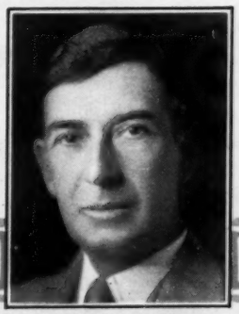


W. S. YARD
HOTEL
ACCOMMODATIONS

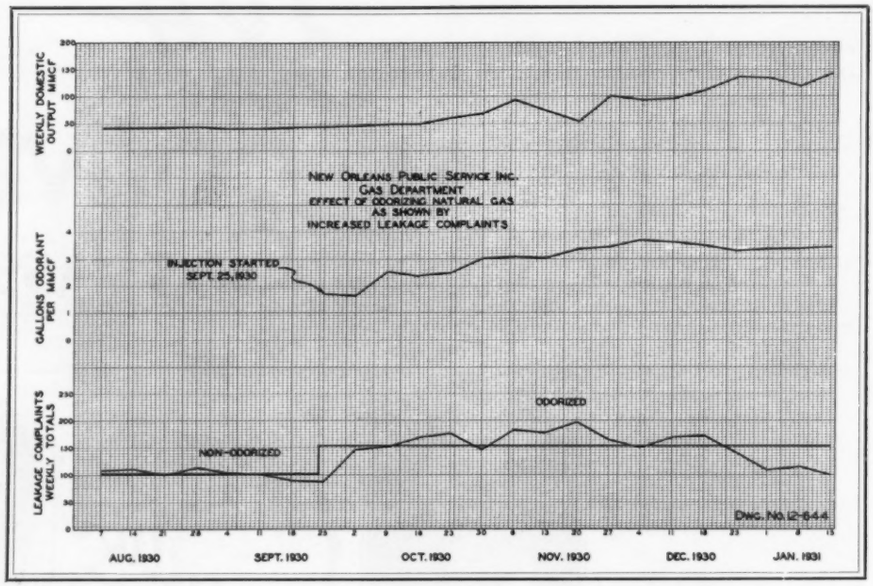


Fig. 1.—An abridgment of the effect of odorizing natural gas in New Orleans as shown by the increase of leak complaints. The straight lines starting at August 7, 1930, and rising at September 25, 1930 (Injection started), indicate the average weekly total leak complaints before and after the odorization program was inaugurated.

Odorizing "Natural"

By HAROLD L. GAIDRY

THE introduction of a stench into the odorless natural gas is gaining the favor of the natural gas industry, since it serves as a warning of a gas leakage long before the concentration of gas has reached the explosive mixture. The use of an odorant is even more important on properties which have been converted from manufactured to natural gas, because every one is accustomed to associating a gas leakage with a characteristic smell, and when natural gas is turned into the lines, there is a tendency to pay little attention to leakage, resulting in danger to life or property due to explosions or fire.

Realizing the importance of such a procedure, the New Orleans company undertook a program to inject a stench into the natural gas so that it would always have a definite odor, as near that of the manufactured gas as possible.

In the selection of an odorant, qualifications which the stench oil should meet before adoption for our use were stipulated. They are as follows:

1. It should be harmless — neither toxic nor nauseating.
2. It should possess a penetrating odor which should be similar to that of artificial gas.
3. It should be insoluble in water.
4. It should be retained by gas and not absorbed by mains or meters.
5. It should be non-corrosive.
6. It should not affect appliances normally adjusted for natural gas.
7. It should burn completely without harmful or odorous products of combustion.
8. It should not set up chemical reactions.
9. It should be extremely volatile and therefore vaporize thoroughly.
10. It should be comparatively cheap and readily available.

The above qualifications of an odorant were adopted from those set up in the Los Angeles area in the course of experimentation with odorant materials.*

**Western Gas*, February, 1930.

After a study of the various odorant oils available, it was found that the product manufactured by the Standard Oil Company of California, known as "Calodorant No. 3" possessed the best qualifications. This fact, along with the knowledge of the good results which the Los Angeles companies were obtaining from this oil, brought about the selection of "Calodorant No. 3", as the odorant to be used in New Orleans. This oil has all of the 10 qualifications mentioned above, and its physical properties are as follows:

Color—Light tan.
Gravity—40.0 deg. A.P.I. @ 60 deg. F.= 0.825.
Specific Gravity=6.87 lbs. per gallon.
Flash Point—Below 75°F.
Fire Point—75° F.
Distillation (By Method 100.13 U. S. Govt. Master Specifications)

First drop @ 130° F. Initial
10% @ 209
20% @ 256
30% @ 279
40% @ 296
50% @ 306
60% @ 328
70% @ 342
80% @ 361
90% @ 384
99% @ 439 Maximum

Molecular weight—125
Vapor Pressure (100% vaporized)

1.0 mm Mercury @ 55°F.
1.5 mm Mercury @ 65°F.
2.0 mm Mercury @ 75°F.
2.8 mm Mercury @ 85°F.
4.0 mm Mercury @ 85°F.

The above vapor pressures are those exerted by the highest boiling constituent of the distillate; determined by obtaining the temperature at which the 100 per cent distillation point is arrived, for a known absolute pressure condition. That is for a given pressure the corresponding dew point temperature is that temperature a which the highest boiling point oil in the distillate will vaporize. It is this significant factor that governs the quantity of oil that can be absorbed by the gas.

Chemical Properties

The Calodorant No. 3 is free from acids and hydrogen sulphide, thus probably eliminating the possibility of corrosion of distribution materials, and as the oil is present in the vapor phase no difficulty is expected with diaphragms and gaskets. The odorant contains an average of 4.5 per cent organic sulphur (bomb test). It is by virtue of this organic sulphur that it possesses its characteristic odor. As to the introduction of sulphur into the gas, a calculation shows that with 3.5 gallons of oil per million cubic feet the total amount of organic sulphur introduced will be less than 1 grain per 100 cubic feet of gas. This is entirely negligible, as the allowable limit as set by most state regulatory bodies is 30 grains per 100 cubic feet.

On September 25, 1930, injection of odorant into the gas for domestic consumption was started. Having in mind the probable large increase of leakage

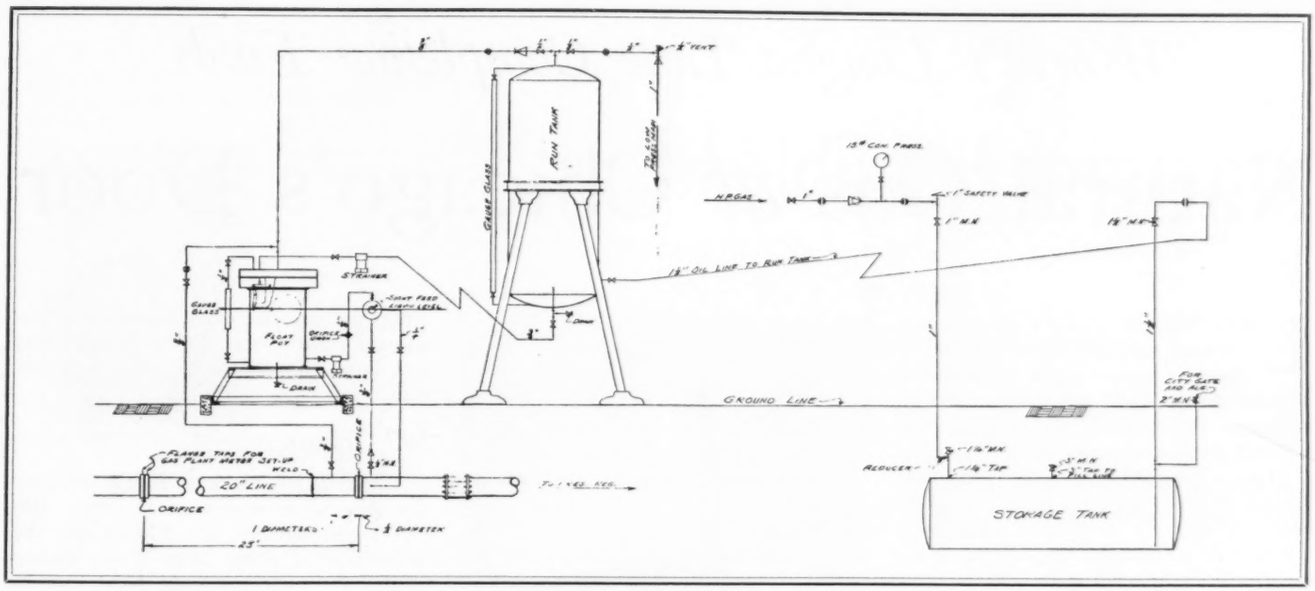


Fig. 2

as Practised *in* New Orleans

Engineer Gas Department
New Orleans Public Service Inc.

complaints that would follow the introduction of odorized gas, the injection of odorant was begun at a low rate and the concentration gradually increased.

With this procedure only large leaks showed up at first. These complaints were taken care of immediately. The odorant concentration was then increased slowly until about 3 gallons per MMCF were being injected. With this concentration all types of leak complaints poured in, and, in particular, very small leaks at consumers' appliances and in house piping. Some of these leaks registered as low as one-tenth of one cubic foot per hour. These small leaks are relatively unimportant; nevertheless they were remedied with as much zeal as were large leaks in services and inlets of meters.

About the time leakage complaints started on the down-trend it was decided to increase the odorant concentration to 3.5 gallons per MMCF, in an effort to locate underground main leaks. The results were immediate, and, contrary to the experience of some other companies, quite a number of main leaks were located by the odor of escaping gas.

At present all gas metered through the city gate station is being odorized to detect leaks in the high pressure system. A survey of all high pressure installations has revealed only very small leaks, mainly in stuffing boxes on valves and regulators, etc. One leak in particular was disclosed in a very inaccessible place. Had the gas been without odor this rather dangerous leak could not have been detected except by systematic investigation. Odorization at the city gate station will be periodical, and only that gas for domestic consumption will be odorized continually.

Calodorant No. 3, in addition to facilitating the detection of leaks, has helped considerably in reducing wastage of gas by excess purging of new pipe lines.

One of the principal economic aspects of an odorization program lies in accurately controlling the quantity of odorant that is used. Since the use of too much of the stench increases operating costs and is also liable to incur drippage which results in discomfort to the community where the drips are pumped, it was decided that some sort of controlling device should be adopted for automatically injecting the odorant into the gas in the desired ratio per MMCF, with a constantly fluctuating flow of gas.

Of the several devices in use, that type developed by the Los Angeles companies gave promise of the best efficiency in controlling the quantity of odorant oil injected into the gas. In this device the flow of oil is regulated by the differential pressure existing between the upstream side and downstream side in an orifice meter installation.

Figure 2 shows the arrangement of one of these controllers at the gas plant distributing station. In this device the odorant passes through a small orifice which is connected in parallel with an orifice in the gas line, thus maintaining practically the same differential pressure on both the gas and odorant oil. With a constant static pressure the flow of either gas or liquid through an orifice is determined by the square root of the differential pressure. After the desired relationship between the two orifices is definitely established the proper ratio of oil flow is automatically maintained within reasonable limits.

The odorization system consists primarily of a 12,000-gallon storage tank, a 300-gallon daily supply or run tank, and controller. Odorant oil is transmitted from the storage to the run tank by gas pressure. The oil then feeds by gravity into a float pot, the liquid in which is maintained at a constant level by an automatic float valve. The gauge glass indicates the level of liquid in the float chamber. A small gauge line is connected to the upstream side of the gas orifice and to the top of the float pot, thus maintaining the same pressure in the float pot as in the upstream side of the gas line. A small gauge line from the side of the float chamber carries the odorant through a strainer and an orifice to a sight feed which allows the oil to flow by gravity into the down stream side of the gas orifice tap. The oil upon entering the gas line is completely vaporized. The vapor pressure of the odorant is such that it does not require atomization. It will be noted that the flange taps of the meter setup were not

(Continued on Page 64)

World's Longest Line Completion Finds

Natural Gas *at* Chicago's Door

LAYING the world's largest and longest pipe line—and getting it done on time—is the achievement of the construction companies participating in the building of the Texas-to-Chicago natural gas pipe line.

Only a few odds and ends of the job remain to be cleared up as this is written. The main part of it—the long 1,000-mile span from the Texas Panhandle to the metropolitan area of Chicago—has been finished and tested. In the words of the engineers: "It's a bottle-tight job."

A Few Figures

The line has been built to operate at pressures as high as 800 pounds if necessary, and has been tested at higher pressures. The full capacity of the line—175,000,000 cubic feet a day at 600 pounds pressure, 225,000,000 at 800 pounds pressure—will not be utilized of course until the market for gas is further developed in the Chicago metropolitan and adjacent areas.

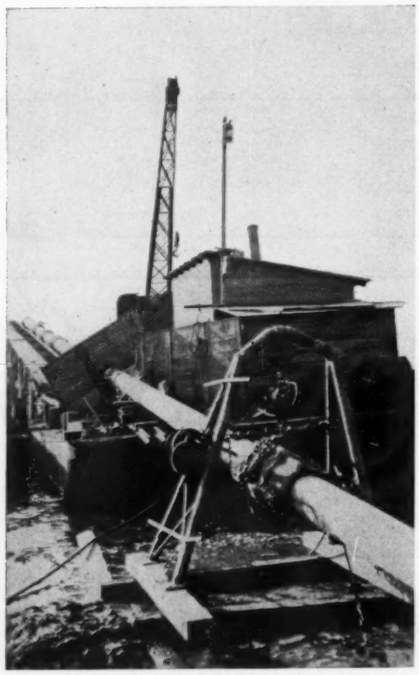
Total costs of this project are expected to run well above $75,000,000. These expenditures have been no small help in keeping mid-western business from bumping too hard on rock bottom.

Nearly 10,000 freight car loads of 24-inch steel pipe were used in the pipe line. The pipe itself weighed an estimated 220,000 tons.

In addition to the pipe, almost 50,000 couplings were used, in spite of the fact that most of the joints were welded, both by electric and gas weld processes.

It has been estimated that nearly 75,000,000 cubic feet of earth were removed and replaced in digging the 1,000-mile ditch for the pipe, and the total labor on the job amounted to 2,500 man-years—that is, a crew of 2,500 men working every day for a year.

Giving the pipe a protective covering against chemical action in the ground was another detail indicating the amount of labor involved. Every inch of the 1,000 miles of pipe had to be so treated on the ground as link by link was laid. Great sections of it also had to be wrapped by hand.



Pipe-laying barge as seen from the river bank. In the foreground is the hand operated winch; the shield around the pipe hides the welder. Note river clamps already attached.

Acquiring and clearing the right-of-way was of itself a sizeable job. More than 12,000 separate leases, signed by 2,600 individuals, were necessary to obtain the right-of-way In no instance was any land condemned for the right-of-way.

100 Crossings

Construction work included carrying the pipe line across more than 100 rivers and streams, the Mississippi, the Missouri and other large rivers among them. At river crossings, from four to 10 lines were laid. In a few places the streams were bridged by small concrete piers, but in most instances the river bottom was dredged and the pipe laid on the bed of the river.

Probably the most interesting single example of these operations, from the engineering point of view, was the Mississippi River crossing, three miles south of Muscatine, Iowa. The job was complicated by the fact that for several miles on each side of the river the line had to be laid through soft ground that was often nothing but a marsh.

The main 24-inch pipe line was branched out, about a mile on each side of the river, into two 18-inch lines, which came up to the river bank about a quarter of a mile apart. At the levee, each 18-inch line branched out into three 12-inch lines, which were bent to run over the levee and down to the water's edge.

Gravel was pumped from the river bed to cover these pipes to a depth of several feet—a precaution made necessary by the flood-hazards of the Mississippi. In addition, a ditch was dredged on the river bottom for each separate line, so that none of the pipes would be injured by boats and barges navigating the river at this point.

Engineers in charge of the river crossing employed an entirely new method of doing the job, which is best illustrated by the accompanying photographs. A hand-operated winch at the river's edge raised the pipe off the ground and elevated it to an approximate 10-degree

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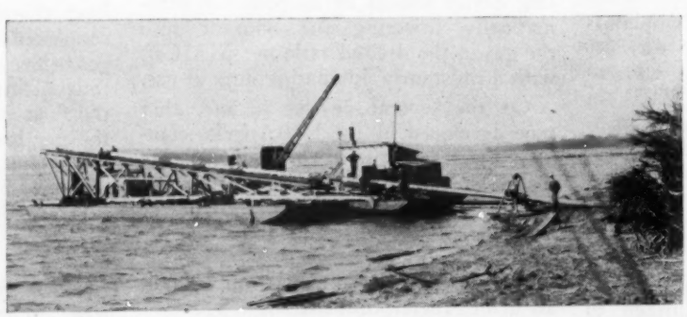

Side view of the pipe-laying barge. Behind it is the barge with derrick which supplied it with pipe. A six-day journey across the river was just being started when this view was taken.

The Position of The Holding Company

By R. W. MILLER

Executive Vice-President, Pacific Lighting Corporation.

AS AN essential factor in the development of the utility industry, the holding company has a record which closely parallels the splendid history of individual operating company growth. Mr. Miller, in his accompanying discussion, traces that record, beginning with the origin of the holding company in the utility industry's need for new financing. His remarks were given before the spring conference held jointly by the Pacific Coast Gas Association's Commercial, Public Relations, and Publicity and Advertising Sections.—EDITOR.

R. W. Miller

FROM all that we have heard about the holding company in the past six years, and particularly in the past two years, from intellectuals such as Professor Bonbright, continuing down through those not so fair and scientific in their criticism as typified by the Roosevelts, the La Follettes, the Norrises, and possibly ending with the Pinchots, the uninformed would conclude that holding companies were conceived in iniquity, dedicated to the malicious exploitations of our Nation's natural resources and, as the widely published inaugural address of Governor Pinchot has so slanderously stated, backed by "the whole fabric of political corruption, the underworld, the protected racketeer and the criminal of high and low degree."

Public utility, operating and holding companies are part of the business fabric of our Nation. Such accusations as are made by Governor Pinchot and Senator Norris are nothing more than slander against the men of the public utility industry, who are not only superior business men, but men of high moral standards in the communities in which they live and in the activities of the Federal Government, in which many of them have held important positions of public trust. They are men who have given generously of their services during times of national emergency, and who have rendered something more substantial than lip service towards the amelioration of our present problem—unemployment—by fostering and instituting expansion programs not equaled by any other industry. It is unwise to disturb the vast investments of this industry, to embarrass the huge army of employees and to discourage their expansion programs which have certainly mitigated the distress of the present depression and may be a major cause towards the recovery of conditions in general if they are permitted to proceed with confidence and without harrassment.

As to how such slanderous, libelous accusations and misconstructions of facts should be met by the industry and how I, as an officer and direct representative of these maligned holding companies should receive them, has been most ably set forth by Mr. Reid, president of the National Electric Power Company of New York, who points the way which we must follow, in these words:

"Have not utility companies and industries as a whole suffered an injury in letting pass unchallenged so many of the charges which have been hurled at them? I believe that our companies and our industry should have answered more of these attacks. I believe that our policies and our viewpoints towards this problem should be revised. Our silence has been misunderstood, and has, consequently, made the work of our critics easier."

There is nothing sinister or mysterious about the gas and electric industries' marvelous development nor in the huge investments which in many instances have been supplied by the holding companies. It is all understandable, reasonable, based on sound economics and the evolution of natural necessities. That we may not convert the virtue of silence into a sin let us review the developments of these holding companies.

It was early realized by public utility managers that because of the huge capital investment required and the necessity of securing a sufficiently large volume of output to permit charges for the service which would be attractive to the public, it would be necessary in each locality to establish a centralization of control and concentration of sales territory. This is what our economists more ably designate as a "monopoly."

This they proceeded to do but it was soon observed that two major problems confronted them.

First: What was the most economical method by which newly acquired properties could be financed?

Second: What form of organization could be most economically administered and operated?

Here we have two fundamental economic problems which have no foundation other than in economics, and which in the long run have always controlled whether we have willed or not;—problems to the application of which there is no end. There should be no mystery attached to attempts at their solution because these are the two primary economic problems which not only confront the public utility industry but all other types of industry of any magnitude. The one early difficulty with which the light, power and gas industries were confronted was financing, and this was probably more responsible than any other one thing for the development of the holding company. This problem of marketing securities, an extremely important function of any company's development when it has outgrown the individual proprietorship or partnership method of financing and operation, was insurmountable for the smaller and more remotely located utilities.

WITH individual companies, the market for their securities was of necessity local in character and except for the larger cities, the securities were salable only in their home markets where they were known. With these restricted markets, public utility companies were required to pay higher rates of interest than railroads, banks and large industrials in order to attract capital. The holding company has broadened this market. It has given the securities of its subsidiaries credit greater than was possible for those companies serving as individuals. This, of course, is only one phase of what holding companies have accomplished, but it was the earliest manifestation.

In inspecting the history of holding companies, we find that prior to 1890 certain manufacturers, such as the

Thompson, Huston Electric Co., sought ways to realize upon the securities taken in part payment for apparatus which in most cases were taken pending the absorption of the operating company's securities by the general public. On four occasions, this particular company lumped together its holdings and deposited them with trustees who issued trust certificates backed by the securities of operating companies. These trust certificates in turn were purchased by Thompson, Huston Electric Co.'s stockholders for cash, and then gradually as the market was developed for the underlying securities of the public utility companies, they were disposed of and the trust certificates were redeemed for cash.

AS you will see, there is nothing mysterious or involved about this transaction. The electric utilities needed the apparatus to give service but they had no cash to buy. They therefore paid for this apparatus in the securities which they would have liked to sell but could not. The manufacturers accepted the securities until such time as a market could be created and the manufacturer thereby obtain his money for the articles which he had manufactured and sold.

In 1890, this same company, in order to render more effective assistance to the various local central station companies which had become its licensees, organized the Utility Electric Securities Co. with offices in Boston. This company issued its preferred and common shares to the manufacturing company in payment for operating company securities then held by that company. The preferred shares were sold to the public and the common stock remained in the possession of the manufacturing company. The purpose of organizing the Utility Electric Securities Co. was to assist in the financing of local lighting companies by purchasing issues of bonds of those companies for which there was at that time no general banking provision. These were held by the securities company which in turn issued its own bonds on the credit standing of the manufacturing company. In other words, the electric company took the bonds or promises to pay of the utility companies which had no public credit standing, or at least were unable to develop a market for their securities, and sold in their place the bonds of their own company backed by those of the utilities and the credit of their own organization.

Similarly the Edison interests, which subsequently were consolidated with the Thompson, Huston interests in 1892, organized the Edison Lighting Co. in the early 'eighties to act as a holding company for stocks of local lighting companies which had exchanged their stocks for license to operate under the Edison patents. These were the early forms of utility holding companies, but the needs of the electric light and gas industries for capital were greater than could be supplied by the manufacturers, and the need for other financing soon became apparent.

Among the early holding and financing companies of the gas industry was the United Gas Improvement Co. of Philadelphia, "first incorporated in 1882 to construct, maintain and manage any work, furnish all necessary material, labor and implements of any kind, to hold and own securities in any form either as collateral or otherwise, and dispose of same." This company is still in existence today and has held to the purpose of its original charter enjoying the trust and confidence of the investing public. The first activities were in the field of gas, and subsidiary companies were consequently formed to own, construct, operate and finance this service. Such a company was the American Gas Co. of Philadelphia. Subsequently the United Gas Improvement Co. also acquired electric properties as well as gas properties. Among other early companies, which will be recognized because they are in existence today, were the North American Co., organized in 1890, and the American Light and Traction Co., organized in 1901. Some of the engineering firms, such as Byllesby, Barstow, J. G. White, and Stone and Webster, were organized in the early part of the 20th century. These engineering companies, in the same manner as manufacturing companies, had had to take securities of public utilities in payment for their services and in the absence of general public demand for the securities of unknown local operating companies, they found it necessary, as the manufacturers had done, to form investment banking connections, or as later was done, to establish such agencies of their own.

THESE financing organizations were invaluable to the industry. They made cheaper service charges long in advance of what might otherwise have been possible. In this day when the worth of a known public utility stock is taken as a matter of course, we have lost sight of the great strength which this early movement gave to the industry.

It is very doubtful whether we have ever appreciated its significance because the industry, with the help of these organizations, grew so rapidly that the early weaknesses of the business of the local operating companies were never realized by the general public. It was indeed fortunate that such a large number of gas and electric utilities came under the influence of such organizations as the United Gas Improvement and the North American companies. These local utility companies were saved the disaster and embarrassment which befell many of the independent street railroad companies of that time.

THESE companies, which have so largely supplied the money for the development of this tremendous industry, have been called holding companies, but a better name would be "utility investment companies." They were formed for this very purpose, and had it not been for them, it is very doubtful that the huge sums of money which have been raised could have been raised and that the remarkable industrial development as well as the development of the utilities themselves in this country as exists at this period could have taken place. The developments of the past few years in holding companies have only been a further refinement and enlargement of the type of organization used in the beginning because the same fundamental economic causes which existed then and were taken cognizance of, exist and are controlling now.

There appear to be three general classes of holding companies.

First: Where there is a quasi-operating relationship, the holding company, having some measure of supervision, making purchases or rendering engineering or other technical services, or providing for purchases or services for the operating company from other units of the holding company's organization. This class is usually characterized by contracts between the holding company and its operating subsidiaries covering such management matters. In some instances there is a separate affiliated management company unit.

Second: Where there are sales of the entire output of the holding or producing company to the operating subsidiary, or where there are leases or sale of apparatus or facilities to the operating company. Frequently, there are elements of both the first and second class and sometimes there is a disregard of the subsidiary corporate entities.

Third: Where there is merely ownership or control of securities of operating utilities, the characteristics of an investment company prevailing.

Thus, briefly to sum it up, we have the first type in which the holding company actively constructs and manages as well as finances; the second, in which the holding company, because of eco-

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Good Showmanship Sells Hot Water *in* New Orleans

By J. C. BARNES

Director of Advertising, New Orleans Public Service Inc.

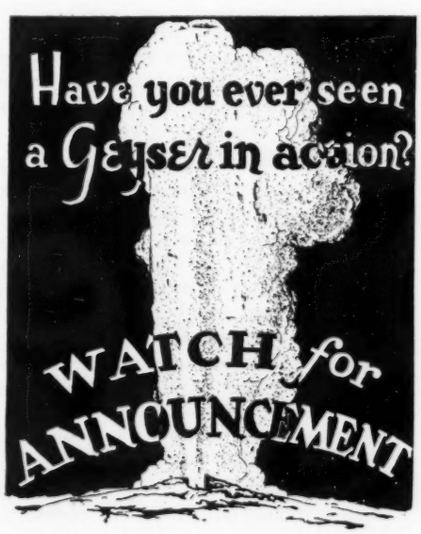
NEW ORLEANS' First Annual Hot Water Service Show, featuring the latest developments in automatic water heating and the uses of the modern water heater as an aid to health and cleanliness, was held in the New Orleans Public Service Inc., building from July 13 to 18.

This show, which drew an attendance of over 25,000 despite three days of unusually inclement weather, was sponsored by the New Orleans Hot Water Service Association—composed of water heater dealers, licensed master plumbers, and New Orleans Public Service Inc.

The company at the present time, in order to increase its gas and electric load, is concentrating particularly on the promotion of automatic refrigeration and automatic water heating.

$1000.00 IN PRIZES
AWARDS MADE DAILY —
SEE THE GIANT GEYSER AT THE SHOW
Announcing the 1st ANNUAL
WATER HEATER SHOW
NEW ORLEANS PUBLIC SERVICE BUILDING
JULY 13 THROUGH 18
OPEN 10:00 A.M. to 10.00 P.M. DAILY
The New Orleans Hot Water Service Association will present the first Water Heater Show to be seen in New Orleans featuring new developments in automatic water heating. The following water heaters will be demonstrated at the Show: Ideal Hoteoil, Koibles, Ever-hot, Crane-Premier, Huffman, Humphrey-Rund, and Pittsburg.
Replica of Famous Yellowstone Geyser
A replica of Old Faithful, famous Yellowstone Park geyser will be seen in action at the Show. The geyser, like the original Old Faithful, erupts, growling and hissing its warning before sending its steam and water skyward. Many features of special interest will be found at the Show. All who attend have an opportunity of participating in the awards.
Special Events
Lectures on Health and Cleanliness
Talks on new uses of Hot Water
Playlet "Singing in the Bath Tub"
Music
PITTSBURG
HOFFMAN
NEW ORLEANS HOT WATER SERVICE ASSOCIATION

12,000 lines of newspaper advertising, electric signs, street car cards, direct mail pamphlets and invitations, were among the publicity agencies used to draw the 25,000 attendance to New Orleans' First Annual Water Heater Show.



An example of "teaser" advertising carried in advance of the Water Heater Show. A replica of the "Old Faithful" geyser, created on the display floor of New Orleans Public Service Inc., was featured in the copy.

A Food Preservation Show was staged last year in cooperation with the various refrigerator dealers, which met with such pronounced success that it was considered advisable to arrange a water heater show of a similar nature. The decorative theme and feature attractions of the show were worked out through conferences between the commercial and advertising departments of the company, water heater dealers, and licensed master plumbers.

ATTENDANCE ATTRACTIONS

It was realized that special attractions other than the mere display of water heaters would be necessary in order to attract a crowd. After considerable investigation it was decided to create a replica of the famous "Old Faithful" geyser of Yellowstone Park on the display floor as a special feature of the show. This attraction lent itself to the show type of advertising copy, and at the same time epitomized hot water. Other features were a giant water heater erected on the marquee of the building, towering more than 30 feet high; also a very elaborate show window display depicting the evolution of water heating through the ages. Beautiful fountains in a setting of tropical shrubbery added further attractiveness to the show, and unusual care was given to ornamental lighting effects which made the entire display floor a very colorful and attractive scene. Special music was also used throughout the show.

Each of the seven water heater dealers was given a special booth on a raised platform, which made possible water and gas connections for the actual demonstration of the heaters. The water heater dealers took particular pains to make their booths attractive, and to be able to give a very effective demonstration of the operation of their particular heaters.

In the set-up of the show no expense devolved upon the dealers themselves other than moving their heaters to and from the show, and the special credits in the form of attendance prizes that each allowed on the purchase of his particular heater. All advertising and publicity matter was paid for by the company. Licensed master plumbers made the necessary hook-up of the heaters without any charge to the dealers.

In addition to the special features of the show such as the geyser, fountains, etc., designed to attract the crowd, attendance prizes totaling approximately $1,000 were awarded during the show. These were in the form of credits to apply on the purchase price of a water heater. During each day of the show one or more dealers were allowed to feature their particular heaters by awarding credits as attendance prizes. Further, a general attendance prize for the entire show of one water heater was

(Continued on Page 70)

Gas *and* Electric Ranges

a Practical Comparison

By E. I. KELLY, W. A. WARNER, C. E. ENGFER *and* H. J. GRIBBON

Commercial Department, Portland Gas & Coke Company

IN selecting a range for the average home needs the following functions are fundamental: Broiling, frying, roasting, baking and boiling. The range must also have sufficient space on top to accommodate the preparation of an entire meal in the shortest possible space of time.

The modern electric range is now obtainable in many different models and sizes, to meet the household requirements of the modern American housewife. There are many features in the electric range which are desirable, but by no means exclusive.

Let us review some operating features which characterize the modern electric range.

First, consider the cooking top on the four-element electric range, operated and controlled by the turn of a switch to give the three different heats. This type is not flexible, since it is only possible to obtain three temperatures, which may or may not be the exact heat required.

The sizes and shapes of vessels used on electric ranges are important. Laboratory tests show that there is a considerable loss in efficiency where vessels smaller than the element are used. In order to keep cooking cost at a minimum it is advisable to use flat bottom vessels to take advantage of conduction as well as convection of heat.

Since only comparatively low temperatures are obtained on an electric range, frying is not generally satisfactory.

The greatest appeal of the electric range has been the insulated ovens. The non-combustion feature has been heavily stressed. However, lack of air circulation results in the accumulation of steam and particles of food being thrown off during the process of cooking, the whole being deposited on walls and bottom of the oven, making it decidedly difficult to keep clean. One of the most important features in baking operations is the need for some ventilation to brown properly.

Electric salesmen frequently claim less shrinkage of meat when cooked in an electric oven. There could be very little difference in the shrinkage of meat in either gas or electric ranges since the time and heat factors are the same in each case. The following shrinkage test recently made by Elsie R. Hinckley, director, Home Service Bureau, Tappan Range Co., is interesting:

"Rolled rib roasts were used, all roasts coming from the same anmial and from the same portions of the rib. Meat was seared 25 minutes at 500 degrees and roasted 15 minutes per pound at 450 degrees. The percentage of shrinkage in each oven was as follows:

Non-Insulated Gas Range	*Insulated Gas Range*	*Electric Range*
34%	29%	39.9%

All roasts looked alike when finished, were done to the same degree and as far as I could notice, were similar in flavor. Slightly varying amounts of fat in these roasts would probably influence results somewhat."

It is generally conceded that the broiler is the weakest point of electric range use, as the door must necessarily be left open to carry away the moisture and burnt greases, since there is no venting provided for that purpose.

Broiling is impractical on an electric range, as it generates but 5118 B.t.u.'s hourly, and is very slow. The gas broiler with a heat input of 16,000 B.t.u.'s (Approximately three times that of electric ranges) makes broiling quick and convenient. It makes steaks and chops more palatable and easily digested.

Also in leaving the oven door open a great deal of heat escapes, thereby increasing cost of operation. Further, the cooling effect with the broiler door open makes for unsatisfactory results in broiling, lengthening the period of time to complete the operation.

Modern Gas Range

A modern gas range can now be had in any color, design and style. It can be fitted to suit the desire of the most exacting housewife. The cooking top can be furnished in either open or closed design. The smoothtop merits all the claims made for it. The ordinary gas range cooking top consists of four burners, usually equipped with two small and two large burners. Others have four large and one simmer burner. This allows for different size utensils and conditions.

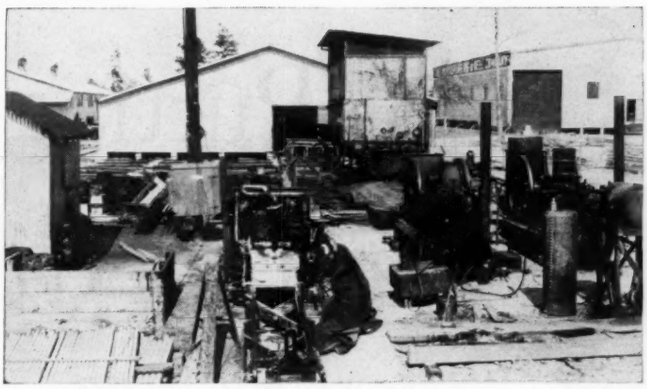
The smoothtop range is so decidedly an advantage that it is well to describe it here briefly. It affords a smooth surface, easily kept clean; larger cooking area is available, comparing favorably with the old style wood range. This means a greater number of vessels can be accommodated at one time. The top burners are flexible, inasmuch as the desired temperature can be controlled at will.

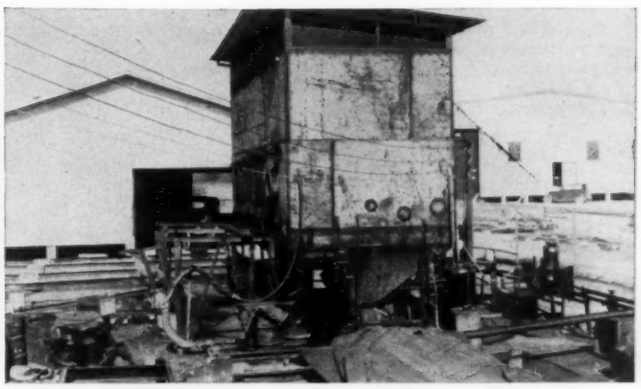
Gas ranges can now be had with or without insulated ovens. The latter have advantages in keeping the kitchen cool in summer, and make for economy. The non-insulated type is somewhat faster in preheating and in some cases is desirable, depending upon the individual family needs.

Heat controls are furnished on all

(Continued on Page 58)

FOR the use of the Portland Gas & Coke Co. commercial department this comparison of gas and electric ranges was recently made by members of the utility's staff. The facts presented are not necessarily new, but it is fairly certain that they are too little appreciated and too little used by gas sales representatives. Electric competition is a real force in the Pacific Northwest, and the facts here offered are of definite utility for gas men in that section. They belong in every gas man's sales kit, wherever electric ranges encourage inroads into the cooking load—EDITOR.





LEFT: General layout of Houston Natural Gas Company's pipe cleaning and wrapping plant. RIGHT: Close-up of the blasting house.

Cleaning Pipe *with* Air Blast *and* Steel Filings

By ROBERT M. HUTCHISON

Chief Engineer
Houston Natural Gas Company
Houston, Texas

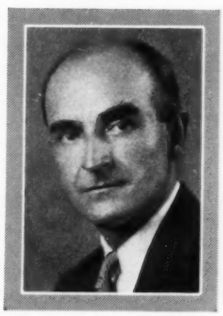
IT HAS been known for years that when any surface is to be covered with paint or some other protective coating, that surface should be perfectly clean in order that the application can penetrate and thus insure the best protection.

This fact is undoubtedly true and should therefore apply in the process of coating pipe. Unless all dirt, oil, grease, mill scale and rust have been removed from the surface of a pipe, any pipe coating applied will not prove entirely satisfactory, the weakness being in the poor bond between the pipe and the priming coat.

It is true that a pipe coating that will suffice for one locality may be entirely unsuited for another; but this fact does not lessen the importance of having clean pipe. Let us even go further and say that the surface should not only be clean it should also be *receptive*. In other words, the surface should be treated in such a way that in applying the protective coating the material can penetrate and thus form a good bond with the pipe.

Pipe may appear clean to the eye, but the microscope will oftentimes show fine particles of mill scale and rust; and to insure clean pipe it requires a force great enough to remove all foreign matter.

Such a force will not only clean the pipe; it will also leave the surface rough, and minute inspection will then fail to reveal any fine particles still adhering to the pipe.



R. M. Hutchison

Various attempts were made at this plant to secure a satisfactory, clean pipe surface; but it was not until the steel filing, blast method was employed that this was accomplished.

Sand blast was tried and the results were a big improvement, but because the sand could be used only once it was decided to try steel filings. After some few experiments everyone concerned was convinced that the best method yet tried at this plant had been found.

A blast plant was then erected, and all main line and service line pipe is now cleaned, primed, coated and wrapped at the warehouse.

The cleaning plant was erected at the most advantageous position to fit into the pipe handling requirements. It is adjacent to the pipe racks and close to the pipe wrapping machine.

The mill pipe from the racks passes through the cleaning plant, is wiped, passes through the priming machine, and thence to a rack where it is given sufficient time for the primer to dry.

From this rack the pipe passes through the coating and wrapping machine and is stored until used.

The process is continuous from the time a joint of pipe enters the cleaning plant until it reaches the storage racks.

Blasting is done in a small steel building about 10 by 22 feet by 18 feet high. A screen extends the entire distance around the building just under the roof. This screen allows a great deal of dust and dirt to pass out at the top of the building, but the steel filings remain inside.

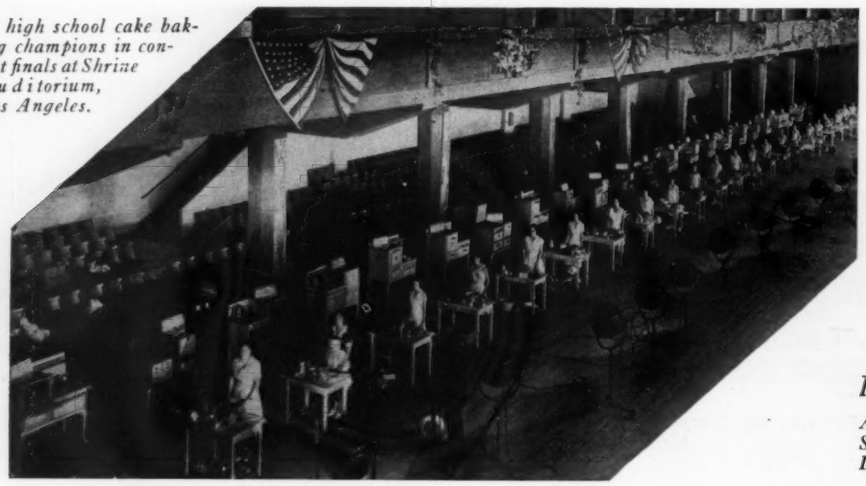
There are two doors, one on either side of the building through which the pipe enters and leaves the building. These are sliding doors and are controlled by weights.

Extending across the building, from door to door, steel rails support the pipe as it passes through the plant. These rails have a pitch toward the exit side so that the pipe will roll.

The pipe rolls onto the rails one joint beside another; then when the building is full the blaster starts the cleaning operation. After the top of the pipe is cleaned, the joint of pipe next to the exit door is transferred to the inlet door. This allows the other joints to roll, thus exposing the uncleaned surface.

This operation is repeated until the entire circumference of the pipe has been cleaned.

(Continued on Page 56)



23 high school cake baking champions in contest finals at Shrine Auditorium, Los Angeles.

Putting Art

By WALTER D. THURBER

Advertising Manager
Southern Counties Gas Company
Los Angeles, California

IN a series of cake-baking contests held throughout southern California, more than 6,000 high school girls recently proved to themselves, their fellow students, their parents and the world at large that cooking tradition, handed down through generations of women, is still a part of the equipment of young Miss America, regardless of those who would traduce the youngsters of today.

It is true that hundreds of them had never baked a cake before. It is noteworthy that in a number of the high schools those who won their high school championship had never previously baked a cake. But, inspired by the spirit of competition and remembering the teachings of their mothers and grandmothers in the distinctly feminine art of producing a good cake, these young women practiced and practiced in their home kitchens—many of them baking more than a dozen cakes before entering the contest—until success at last was theirs. It has been estimated that these cakes, if placed side by side in a row, would make a line nearly two miles long!

CONTEST FUNDAMENTALS

The series of contests, which aroused as much enthusiasm as any inter-scholastic athletic event in more than a score of southern California high schools, was developed and encouraged by representatives of Southern Counties Gas Co., who kept the following points constantly in mind:

1. To assist the Girls' League in the high schools in our territory to acquire needed funds for their league treasuries through a public sale of cakes baked in connection with their contests.

2. To assist the Home Economics Departments of the high schools by arousing a new and fresh interest in cooking.

3. To keep the contests entirely free from commercialism, since, for example:

(a) There was no provision that the cakes entered in the contest should be baked on a gas range.

(b) Advertisers of flour, shortenings, etc., were urged not to exploit the schools through advertising of their products in connection with the contests.

(c) The gas company took no prominence in the publicity attending the contests, but, on the other hand, all credit was given to the school girls' leagues and their faculty advisors.

4. To stimulate the desire of girls, who will be home makers tomorrow, for increased proficiency in the delicate art of cake-baking.

The proposal met with the instant approval of both school authorities and parents. School people recognized in the project a move which would stimulate interest in their domestic science department, and arouse the mass interest of the girls as athletics interest the boys, and which would help them reach in a direct way many girls who had been difficult to reach in the ordinary school routine. Parents, especially mothers, were interested since it is characteristic for every mother to want her daughter to be a good cook—especially a good cake maker—just as every Dad hopes his boy will make the 'varsity.

Since there were four prize winners in every contest this natural pride found numerous outlets, especially in those instances where the prize winners, prior to their practice work preliminary to the contests, never before had baked a cake. The procedure in each case was simple, but carefully planned before it was translated into action. Here are the moves in the order in which they were made:

1. The school authorities (principal, assistant or vice-principal, and girls' advisor) were interviewed and the project presented along the lines indicated earlier in this article.

2. The Girls' League, in a general assembly, was told the story of the project in a presentation calculated to arouse their interest and their instinct to excel.

3. Upon an affirmative vote—in every instance unanimous—the league would appoint a committee of its own members to have charge of the contest, select the judges, conduct the public sale of cakes, etc.

W. D. Thurber

4. Our company offered a total of $25 in cash prizes—$10, $7, $5, and $3, for the four best cakes. We also offered the use of our local offices for the public sale of cakes and agreed to run two display advertisements in the local newspapers calling attention to the cake sale—all of the proceeds of which went to the treasury of the league.

5. In each instance F. S. Wade, our president, purchased the prize winning cake for $15. The local editor usually purchased the second cake for $10; a local bank, the third cake for $5; and some other public spirited person, the fourth cake for $3.

6. Judges, selected by the girls of the high school, usually included Kate Brew Vaughn of the Los Angeles Evening Express and two other well known domestic science experts.

7. In every instance the cakes were all sold. The contests were usually held on a Saturday and the public sale began at two o'clock. The average amount realized by the girls' league treasuries exceeded $100.

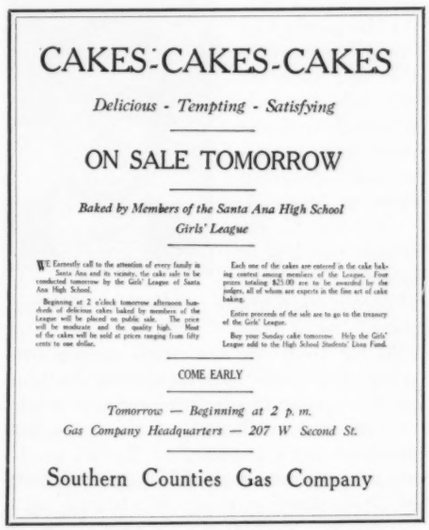
Following the contests we received voluntary expressions of appreciation from school heads and from the girls' league officers throughout our entire territory. These letters spoke of the public spirited attitude of the company in not accepting the spotlight of publicity, of the benefit of the contests have been to the schools and to the girls individually, and of the appreciation of the parents for thus interesting the girls in cake-baking.

These contests, as outlined in the foregoing, were held in high schools at Monrovia, Ontario, Whittier, Fuller-

the Spotlight *on the* Ancient *of* Cake-Baking

ton, Anaheim, Orange, Santa Ana, El Monte, Santa Monica, San Pedro, Wilmington, Ventura and Santa Barbara—in the territory served by Southern Counties Gas Co.

Subsequently the Pasadena Post promoted similar contests in five high schools in Pasadena. The Long Beach Sun took similar action for two high schools in Long Beach. The Los Angeles Express initiated a similar contest in Alhambra, and, inspired by the success of the project in nearby communities, a number of high schools in Los Angeles held contests.


CAKES-CAKES-CAKES

Delicious - Tempting - Satisfying

ON SALE TOMORROW

Baked by Members of the Santa Ana High School Girls' League

WE Earnestly call to the attention of every family in Santa Ana and its vicinity, the cake sale to be conducted tomorrow by the Girls' League of Santa Ana High School.

Beginning at 2 o'clock tomorrow afternoon hundreds of delicious cakes baked by members of the League will be placed on public sale. The price will be moderate and the quality high. Most of the cakes will be sold at prices ranging from fifty cents to one dollar.

Each one of the cakes are entered in the cake baking contest among members of the League. Four prizes totaling $25.00 are to be awarded by the judges, all of whom are experts in the fine art of cake baking.

Entire proceeds of the sale are to go to the treasury of the Girls' League.

Buy your Sunday cake tomorrow. Help the Girls' League add to the High School Students' Loan Fund.

COME EARLY

Tomorrow — Beginning at 2 p. m.
Gas Company Headquarters — 207 W Second St.

Southern Counties Gas Company

With the widespread interest thus aroused, this department suggested to the National Business and Professional Women of Los Angeles that their group sponsor a Southern California cake-baking tournament, open only to high school champions.

The contest was held at the Shrine Civic Auditorium in Los Angeles on Saturday, June 6. In response to invitations sent by the Club to high schools throughout Southern California 23 high school champions filed entries for the event.

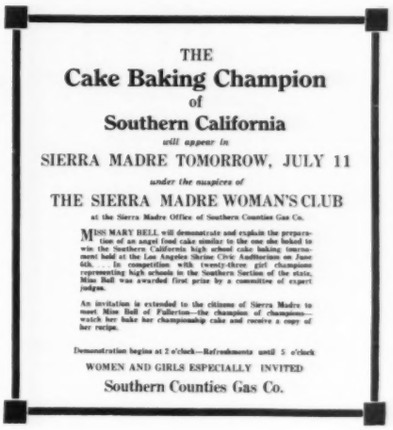
PREFER GAS RANGES

It is interesting to note that every one of these high school champions indicated a preference for a natural gas range upon which to bake her championship entry. The ranges were installed in a row, reaching the entire length of the Shrine ballroom, by a committee of gas range representatives, under the chairmanship of Ernie Hamner of the American Stove Co.

Prize money totaling $100 was provided through the Publicity and Advertising Section of the Pacific Coast Gas Association, and incidental expense of approximately $400, including the rental of the Shrine Ballroom, was met by the three local gas companies.

Every one of the 23 contestants, each accompanied by her mother and nearly all of them by a faculty member of their local high school, arrived early on the morning of the event. News reel cameras filmed every phase of the contest and reporters from the metropolitan dailies were present to record the news of the contest. The University of Southern California Band gave a complimentary concert during the afternoon.

One hundred and twenty-three Whittier Union High School girls contributed to the display shown at the right. Proceeds from the sale of cakes in the local contests were used to assist Girls' League activities.


THE
Cake Baking Champion
of
Southern California
will appear in
SIERRA MADRE TOMORROW, JULY 11
under the auspices of
THE SIERRA MADRE WOMAN'S CLUB
at the Sierra Madre Office of Southern Counties Gas Co.

MISS MARY BELL will demonstrate and explain the preparation of an angel food cake similar to the one she baked to win the Southern California high school cake baking tournament held at the Los Angeles Shrine Civic Auditorium on June 6th. In competition with twenty-three girl champions representing high schools in the Southern Section of the state, Miss Bell was awarded first prize by a committee of expert judges.

An invitation is extended to the citizens of Sierra Madre to meet Miss Bell of Fullerton—the champion of champions—watch her bake her championship cake and receive a copy of her recipe.

Demonstration begins at 2 o'clock—Refreshments until 5 o'clock
WOMEN AND GIRLS ESPECIALLY INVITED
Southern Counties Gas Co.

The local and the final tournament contests were so rich with meritorious news that more than 3,000 inches of news space was given the project by the newspapers, in addition to many columns used by the high school papers throughout this section of California.

On the day of the southern California tournament a complimentary luncheon was served to the contestants, their mothers, and high school representatives, by a group of Los Angeles manufacturers. During the afternoon there followed the selection of the prize winners by a committee of eminent judges, including Mrs. Kate Brew Vaughn, chairman; Marian Manners, Home Service Director of the Times; Florence Austin Chase, Domestic Science Editor for the Copley newspapers; Marion Herbert, Domestic Science Advisor for the Long Beach Press Telegram; Ida Cornforth, noted lecturer on home economics. The prizes and genuine sheepskin diplomas were presented by Doctor Frank Touton, vice-president of the University of Southern California.

During the afternoon the contestants were inspired by a visit by Mrs. Florenz Ziegfeld (Miss Billie Burke), who congratulated them on their ability and

(Continued on Page 42)

Approximately 3,000 high school girls of southern California took part in the contests sponsored by Southern Counties Gas Co. It is estimated that between 15,000 and 20,000 cakes were baked by local contestants.

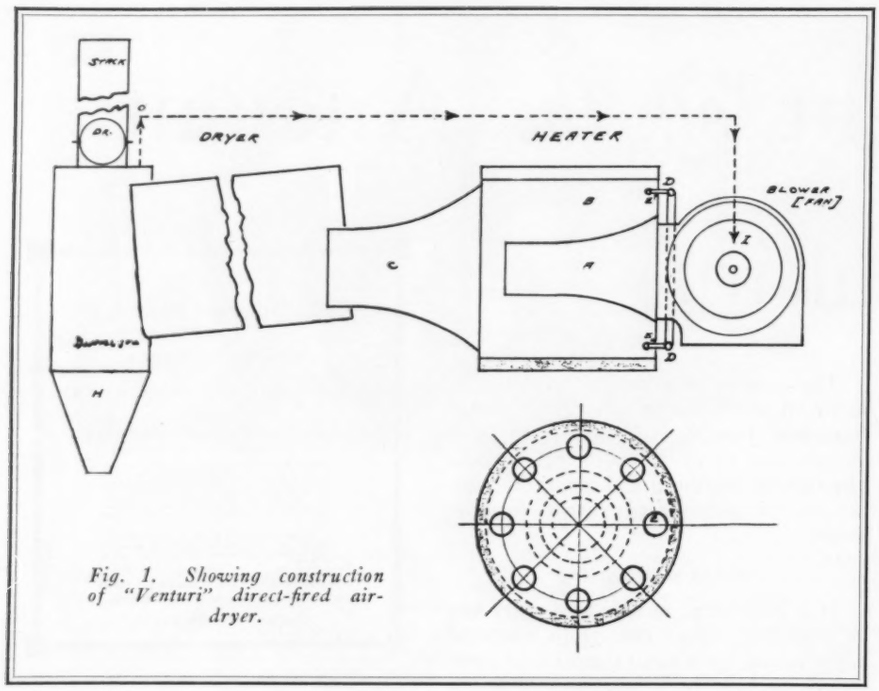


Fig. 1. Showing construction of "Venturi" direct-fired air-dryer.

Designing *a* "Venturi" Direct-Fired Air-Dryer

By HERBERT HAAS

Industrial Engineer, Pacific Gas and Electric Company

IN THE Proceedings of the 37th Annual Convention of the Pacific Coast Gas Association, Vol. 21, 1930, Page 170 (*Western Gas,* September, 1930) the underlying principles of drying with heated air were discussed. In particular, the advantages resulting from the use of air heated directly with gas, the products of combustion of which are in the process of burning mixed with the air so to be used, were described, and examples of its application given.

The following notes describe a type of direct-fired air heater of the writer's design, which embodies a number of new features that have demonstrated their value in operation.

It is frequently necessary to operate "air" dryers under a plenum. If the product to be dried permits of the use of relatively hot air, say in excess of 200°F., the handling of such heated air by fans is not desirable, as specially constructed fans, with water cooled bearings, and other features departing from standard construction must then be used.

One of the salient features of this new type of air-heater is the furnishing only of "cold" air by the fan for the large volumes of air needed in drying, i.e. the air is heated *after* its delivery from the fan.

In the accompanying schematic sketch (Fig. 1) a typical drying installation is shown. It consists of fan, air-heater, revolving dryer with exhauster, and stack.

The fan delivers its air to a properly designed draft tube A. The purpose of this construction is to utilize a portion of the energy of the high velocity air "jet" discharged into the second and larger tube C to create sufficient "draft" in the annular combustion chamber B to "draw" in all of the air needed for the complete burning of the gas used for heating the air supplied by the fan.

Tube C is of the same general form as tube A, but considerably larger in size, depending on the maximum temperature to which the air used in drying is heated. The perimeter of the draft tube A is jointed by an annular steel plate to the circular shell of the heater, the only openings being eight equi-distant burner draft-ports E. Gas to the heater is supplied through circular pipe manifold D with eight burners inserted in ports E. Burners with an atmospheric mixer and a Maxon premix nozzle gave best results. Using a number of burners avoids concentrated fire and results in better and more uniform mixing of burnt gases with the cold air in tube C.

The inside of the heater shell is covered with suitable heat-insulating and resisting linings. Draft tube A can either be made of a heat resisting metal, or covered on its outer surface which is exposed to the hot combustion gases, with a heat-resisting refractory. As the passage of "cold" air from the fan through this tube keeps it relatively cool, the need for a protective covering here is lessened.

Herbert Haas

Tube C in which the highly heated products of combustion are mixed with the cold air from the fan needs only a covering of suitable heat-insulating material on the outside to prevent excessive waste.

The first air heater of this type was designed for a capacity of 10,000 cu. ft. of air per minute at 65°F. and density of .075 lbs. per cubic ft., heated to a maximum of 500°F. Material to be dried, 10,000 lbs. wet (24 to 26 per cent water content) from which 2000 lbs. of water had to be evaporated, resulting in 8000 lbs. of "dry" material per hour. Burners are proportioned for a maximum gas rate of 4,000 cu. ft. per hour of 1150 B.t.u. natural gas. For this rate at least 800 cu. ft. of air per minute must be drawn in through ports E—or about 1/12 of the total fan delivery.

In actual performance in excess of 14,000 lbs. of wet material are dried per hour with very satisfactory results, exit temperature of the air and vapor being around 120-130°F.

The dryer in this case was an existing revolving cylinder with lifting vanes 6 ft. in diameter by 50 ft. long. Air was previously heated by being blown over

(Continued on Page 72)

Fundamentals *of* Combustion Control

By W. P. PORCHER
Measurement Engineer
Texas Cities Gas Company

THE subject of efficient combustion is of practical interest to all industrial gas men. Whether or not they come into contact with the larger installations, they are expected to know something about combustion control. The use of the Orsat in this connection has long been recognized by industrial engineers as the simplest and most satisfactory method of determining whether a fuel is being used in such a manner as to deliver its maximum heating value.

W. P. Porcher

In spite of this wide spread recognition of the value of this method, the fact remains that, too often, the apparatus is not used in cases where no other means would disclose the desired information. It is seldom used on smaller boilers and furnaces, although it often discloses inefficient conditions and the reasons for them, which are not even suspected without the Orsat.

Avoid "Rule of Thumb" Methods

Many gas men who have not used this method of setting or controlling combustion, are convinced that by following rule of thumb methods they can attain conditions favorable to the most efficient combustion. Most of these methods are based on the color of the flame, "haze", etc. The fact that they often cannot see the flame that they are setting by "sight" does not seem to lessen their faith in the method. In addition to this the amount of experience possessed by different men varies widely, and although the appearance of the flame is often helpful, the ability to see even so large an amount as 1½ per cent of carbon monoxide is a gift that is rarely encountered.

It thus often happens that a consumer is confronted with widely varying ideas as to how his burners should be adjusted, by two or more men who may have called on him to service his apparatus. Not the least of the advantages of the use of the Orsat is in furnishing the operator with tangible evidence that his adjustment has been beneficial rather than the reverse. This record may also be filed for future use or be used to settle disputes as to high bills.

The failing upon the part of gas men and many other practical combustion men to take advantage of this most useful instrument is probably due to two reasons—first, to a lack of a true understanding of the meaning of the tests as applied to different types of combustion; and second, to a belief among inexperienced operators that certain results obtained from the apparatus are "inconsistent" and limit its usefulness to certain types of combustion.

As is well known, the Orsat indicates nearly complete combustion by registering a high percentage of CO_2 and a small excess of oxygen in the flue products. It indicates incomplete combustion by recording the presence of carbon monoxide in the flue gases. This, briefly, is as far as the average manual goes in applying the results of the tests, although they are usually very complete as to the method of running the test, which in itself is very simple. However, if the operator limits himself to these two indications only, he is depriving himself of some of the most valuable functions of the instrument.

As an illustration, a test may show low CO_2, together with a high percentage of oxygen. This indicates to the operator that his air supply is too great. Acting upon this indication he may attempt to rectify same by closing the burner shutters or ash pit doors, if burning solid fuel. On taking another test he may be surprised to find more oxygen instead of less, as he would expect, even assuming the load is constant. This is often termed inconsistent. The true interpretation, however, is that there is probably a large infiltration of air through the setting between the combustion chamber and the point where the sample is being taken. This leakage may not even have been suspected previously. In extreme cases the same test may show a small amount of carbon monoxide, together with the increase in oxygen. This is further confusing, but a little thought will show that while the air supplied to the combustion chamber may have actually been decreased below the amount necessary for complete combustion, the intensity of the draft within the setting will be increased by throttling the air at the burner. This condition is of course bettered by using the damper to control draft.

It is much better to stop all leakage into the setting, especially in the case of gas where it is often desirable to control the air to the burner by means of automatically operated louvres. Infiltration of air is always a problem in old brick settings where expansion and contraction make it very hard to keep all holes stopped. Damper control here, together with the use of as low a draft as possible, helps to control this condition.

Basic Principles Guide

If the operator will always keep in mind the basic principles of combustion, the tests will not be found confusing and many things in regard to the furnace and the efficient use of the fuel will be clarified. In the combustion of any fuel a gas is formed, even if the fuel is not admitted as such. To completely burn this gas it is necessary that the burning gas be held at or above the ignition temperature until it has had time to come in contact with sufficient oxygen to burn all of the carbon to CO_2 and all of the hydrogen to water. It is this fact which limits the amount of gas which may be burned in a given furnace volume. If we had a furnace long enough, maintained at a high temperature, and there were no radiation losses, almost any pipe would do for a burner as the gas in diffusing through the furnace would eventually come in contact with sufficient oxygen. In most gas installations, however, furnace size is limited and thorough mixing of gas with air previous to admission to the furnace is a factor in securing complete combustion.

In installing gas in a boiler or other furnace it can be calculated in advance, within certain limits, how much gas can be burned in a given furnace volume. It often happens that this has not been done, and even where it has been done a great diversity of opinion exists among engineers as to how many cubic feet of space per boiler horse power should be allowed. The figures vary from 1 to 3 cubic feet per boiler horsepower. Undoubtedly the amount of space necessary

varies with the shape of the furnace, the efficiency of the burner as to proper mixture, etc.

This brings about a condition that is often puzzling. Samples of flue gas taken at low boiler loads will show complete combustion and CO_2 results approaching the maximum may be obtained with no showing of CO. A test taken at higher loads may show 6 or 7 per cent CO_2 with excess oxygen. As the operator closes down on the damper to decrease the excess air, the CO_2 will increase, but a point is soon reached where the upward trend of the tests breaks and they show low CO_2 together with CO and an even larger excess of oxygen. The reason for this is easily conjectured. As the air supply is decreased the flame naturally lengthens out, "hunting" for more oxygen with which to unite. In doing so it approaches nearer and nearer to the tube sheet, finally coming in contact with it and cooling below the temperature necessary to maintain combustion. This accounts for the presence of CO together with excess oxygen even in a tight setting. This condition is more likely to be found on internally fired boilers than on boilers of the H. R. T. type.

For the same reason it is always advantageous to have all of the air admitted through the burner as in the case of the bunsen and modified bunsen types. By this means the air and gas are mixed before or soon after admission and the rate of combustion is increased. Admitting air above the burner and at the sides of course slows down the mixing process.

On small boilers having blue flame burners the CO_2 will usually be found to be high when the flue has been properly installed with draught hood, etc., and the burner is working at somewhere near its rating. Controlling the amount of air admitted by cutting down the primary air is bad practice as it lengthens out the flame when there is usually little enough space to complete the combustion as it is. Beyond installing the proper sized draught hood and flue, little can be done towards controlling the secondary air as the load is usually fluctuating and enough secondary air must be allowed to maintain combustion at maximum load and prevent smothering. It is readily seen from this that more is to be gained here by installing the proper sized boiler in the first place than in trying to correct a very bad condition after it is found. However, the Orsat will settle any argument as to whether the combustion is correct or not and will often locate an adverse condition even in this case.

In comparing the relative efficiencies of different boilers by means of calculating the heat lost in the flue gases from their temperature and composition as determined with the Orsat, it will often be noticed that high stack temperatures are a greater factor in cases of low boiler efficiency than low CO_2 results. It must be taken into consideration here, though, that high CO_2 is a condition favorable to low stack temperatures even though the temperature of the furnace will be higher. This is due in part to the much smaller amount of the flue products.

In the case of furnaces other than boiler furnaces, such as metal melting furnaces, high flame temperature is usually desirable and is often a prime requisite, both from the standpoint of rapid operation, with consequent low gas consumption, and for the increased quality of the product. If the excess of air is great enough it may be impossible to obtain the desired temperature at all, due to dilution with cold air. Control here is usually relatively easy by means of flue gas analyses, as the load as a rule is constant or nearly so and one setting may be made which will remain as set for months.

Water Gas Combustion

The subject of combustion in the water gas set is introduced here because it is an example of what might perhaps be termed the most complicated form of combustion, and it demonstrates what can be done where the flame is not visible except superficially and where a great range of temperatures and flame conditions are encountered. The tests are more or less conveniently taken at the lid of the generator by means of a hose cock tapped into the lid. The active depth of the fuel bed, from 5 to 7 feet, is alternately cooled by the steam of the "run" and heated to incandescence by the "blast."

The blast: High CO_2, that is 15 per cent with solid fuels, is usually only generated in a thin fuel bed but in the case of a water gas set an analysis of the blast at the top of the generator often shows as high as 18 per cent just after the blast is put on due to the low temperature of the fuel bed caused by the previous run. More heat would be generated if this could be maintained at 18 per cent throughout the regenerative period, but as the fire heats up the CO_2 content decreases, being reduced to CO by passing through a hotter zone of carbon. Reaction $CO_2 + C = 2\ CO$.

Therefore a machine running on gas coke and properly balanced will show:

Beginning of blast....18 to 19% CO_2
Middle of blast.....14 to 15% CO_2
End of blast..... 9 to 15% CO_2

Different fuels modify this slightly. Medium sized hard or foundry coke does not drop much below 15 per cent. Coal will start very low depending on its size and drop very rapidly. In general the free blasting fuels will give higher CO_2 results. Low results at the beginning of a blast, especially towards the end of a coking, may be an indication of blow holes in the fire. It should also be noted that when the CO_2 drops this is an indication that the fire is heating up but also that the heat is being generated in a wasteful manner and a large amount of CO is produced which, if not needed in the carburetor, is wasted at the stack. It is a good idea therefore not to let the CO_2 in the blast go below about 9 per cent on the first blow after coking when it is necessary to do so to heat the cold fuel.

The Run: The chief value of the CO_2 test is found on the run. High CO_2 here indicates too much steam or more particularly too much steam for the temperature and depth of the fire. For instance, if the CO_2 has been running evenly and showing about the same average throughout the course of a coking and then begins to show a sharp rise towards the middle of the coking, the fire is probably too thin and should be cleaned. If it is known from previous experience with the fuel that this is not the case then the CO_2 test indicates that the fire is cold. To remedy this condition either more air per minute may be added or the blast time lengthened. To determine which course to take, CO_2 is run on the blast. If it falls very low towards the end of the blowing period, say 9 per cent, it would be better to increase the air per minute than to increase the length of the blast. If the maximum is already being used and the test shows by low CO_2 that it would be useless to lengthen the blast, either the length of the run or the amount of steam per minute must be cut.

The average CO_2 varies with the time the fire has been run since it was cleaned and the number of runs between cokings. An average of between 3 and 4 per cent for the entire coking is usually sought. Thus the first up run after coking will show something like this:

Beginning of run....0.6% CO_2
Middle of run.....1.6% CO_2
End of run.....3.2% CO_2
Average .....1.8% CO_2

The averages for the following runs will be about:

Run....	2	3	4	5	6	7	8
Ave.....	2.5	2.7	3.0	3.5	4.2	5.0	6.5

The high CO_2 at the end shows that it is time to make a coking. They are of course not always so consistent. The

(Continued on Page 42)

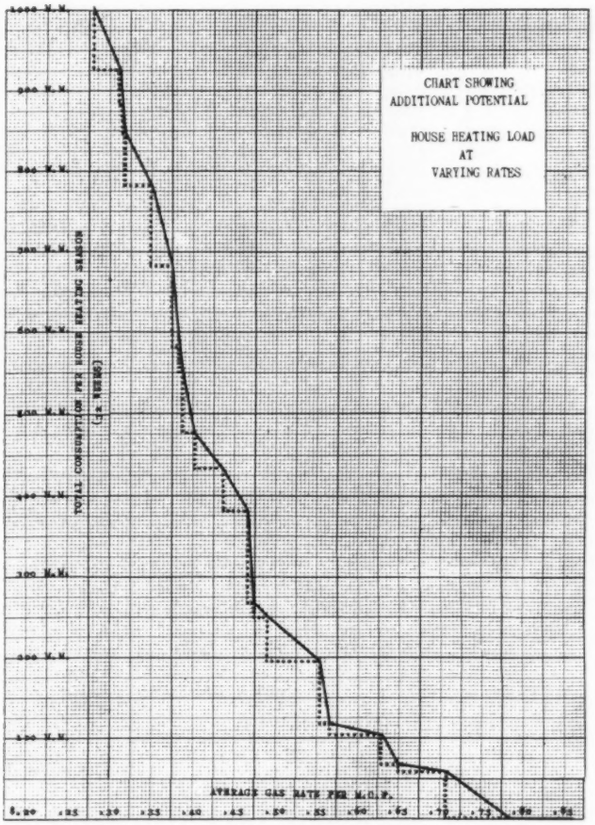


Fig. 1.

Base Your House Heating Program *on* Market *Facts*

By H. W. HAYWARD

Director, Research Institute, Combustion Utilities Corporation

WHILE it is comparatively easy to assemble data on such tangible market factors as population, income levels, home ownership, etc., the author of this article contends with some reason that this information is no trustworthy index of local house heating market potentials. The family dollar is subject to many demands, and one guess is as good as another as to what portion will be alloted to automatic househeating equipment in a given community.

Taking the matter out of the "guess" stage is the answer to the problem, says Mr. Hayward, who has sought to apply scientific market analysis principles to a house heating survey in one middle-western center. The same sort of survey methods which national commodity merchandisers have employed to forecast local demands for their articles will succeed for the gas company house heating sales department, in the belief of the author.—*Editor.*

HOW many gas companies have crudely guessed their market without determining fundamental local factors which would affect it?

How many housing rates have been adopted simply because some other gas company (although under entirely different local conditions) has had a measure of success with it?

How many sales plans and sales organizations have been built up on the basis of someone's guess regarding the local market?

Thoughts such as these convinced the writer's organization that a proper fundamental of merchandising is being neglected in the majority of gas company house seating sales programs.

It seemed to us that a necessary fundamental, exactly as in the case of other industrial market survey work, was, to go direct to potential consumer and determine exactly what they thought of automatic home heating, conditions under which they felt they would purchase, and other reactions which should be taken into consideration in selling to the particular market concerned—in short, to determine the mass thinking, in the particular territory concerned, to serve as a definite guide in rate making, sales plans, advertising, educational work, organization of a sales force to suit local conditions, etc.

This seemed even more necessary and important in the case of automatic home heating, than in some other lines of merchandising, for in this case we are selling, largely, a convenience value.

With these thoughts in mind we designed a method of obtaining a correct consumer reaction on automatic house heating, and with the fine cooperation of a middle-western gas company proceeded to try the idea out in its territory.

In determining the actual consumer reaction we also saw a wonderful opportunity of setting up for the consumer, the value of automatic house heating on an educational basis, so that its many values could more clearly be visualized.

Consequently, the manner in which we sought the information was to break the total overall value of automatic home heating down into various factors of appreciation, in order to receive a consumer reaction on each. In this way, an appreciation of the total overall factors could be logically developed in the consumer's mind.

Our first step, naturally, was to obtain a list of all owned homes in the city.

The second step was to divide these homes into definite price classes.

The third step was to actually contact the homes for consumer reactions.

General information, such as type of home, size of home, type heating system, amount and costs of fuel used, etc., was secured.

In order to secure specific information from present coal users, the overall value of automatic heating was broken down into nine factors, these factors being so dramatized that a tangible, or dollar and cent value, could be assigned to each by the potential consumer, as justifiable for his particular situation.

Thus, the consumer was able to visualize, and justify to himself, the make up of the increased cost of automatic heating.

By a summation of the reactions on each individual factor, from each home contacted, a reaction is secured as to the total overall allowed convenience value for the advantages of automatic heating.

The above, of course, pertains to those potential consumers who are at present using coal.

In the same city, there were several hundred oil and gas users who had already experienced the value of auto-

(Continued on Page 60)

Sioux City G. & E. Cooking Classes Offer Individual Instruction

By Elma Anderson Bails

Home Service Department
Sioux City Gas & Electric Co., Sioux City, Iowa

IT may be interesting, slightly inspiring, and somewhat educational to attend a demonstration cooking school, but according to the reports from women who attend our cooking classes which feature individual instruction, it is much more interesting and much more educational to really do the cooking yourself. The demonstration type of school has been over-done in our city, so perhaps that was another reason for our school being met with enthusiasm.

We do feel that those who come to our classes are not merely idle women looking for a place to spend a pleasant afternoon, but housewives who are interested enough in learning to cook to spend an afternoon at it. The housewife of today has been a business woman. She has had neither the time nor the opportunity to learn how to cook, and since there is a delicatessen shop, bakery, and restaurant on almost every corner, the art of cooking has become almost a lost art. No use for the apartment owner to provide gas ranges when the tenants use only one or two of the top burners. The same thing holds true with other appliances. Most housewives do have a desire to learn to cook, but a young bride who tries to bake several times with repeated bad luck is often discouraged and decides to waste no more materials, time, and energy in trying to learn. Here is where our cooking classes meet a real need.

Our cooking classes are held in a large pleasant room furnished to accommodate 10 pupils. We have four domestic science unit tables, two food cabinets, five ranges, a large automatic refrigerator, electric dish-washer, automatic water heater, and many small appliances. Each pupil has her own equipment with which to work.

The classes are conducted very informally. At the beginning of each lesson, the instructor gives a brief talk explaining the recipes and methods to be used, as well as the use and care of the equipment. The class then proceeds with the cooking, each member deciding on the recipe she is going to use. She usually makes the kind of cake or pie which she has never made or which she is unsuccessful in making. How many times I have heard a woman say: "I want to make an angel food; I have never made one and I am afraid to try it alone." And then perhaps the very next lesson I will hear this same neophyte say, "I made another angel food this week, all by myself, and you should have seen what good luck I had."

The first lesson is a lesson on cake-making, while the second is on pies. One can't realize how many housewives have never made a pie until they listen in on a group of this kind. The third lesson is on desserts, and the subject for the fourth is decided upon by the class. Strange as it may seem, the last lesson is often a lesson in bread-making.

Each pupil enrolls for the four lessons, one each week. She pays only for the materials she uses, and incidentally, in figuring the cost of the materials, she comes to an interesting conclusion: She pays more for these foods when she buys them than when she makes them at home, and they aren't nearly as delicious.

After the baking is in progress, the kitchen is put in order again; each pupil washes her own dishes. Then follows a short demonstration, in turn followed by the serving of refreshments. We give the students every possible opportunity to use the appliances.

Any lesson which allows extra time while waiting for food to be baked provides a good opportunity to show some educational pictures on the various appliances. We show these with a projector machine. They are always enjoyed and give us one more opportunity to show the use and care of our appliances and to sell the idea of using more gas.

After the housewife has finished her four lessons in cooking, she is free to call our Home Service Department for further help at any time, and she also receives a recipe bulletin from the department every month. In this way we feel that we are continuing our instruction in cooking, keeping up the interest inspired by the lessons, and making more friends for the gas company.

Change-Over Program in Progress

SEVERAL gas companies serving manufactured gas in towns along the route of the Continental Construction Corp.'s line from the Texas Panhandle to Chicago are changing their systems over to use natural gas.

The Princeton Gas Co., serving some 4,762 consumers in Princeton, Ill., is negotiating with officials of the pipe line company for a supply of natural gas. The main line passes about one mile north of the town.

Dixon, Ill., a town of 9,908 population being served manufactured gas by the Illinois Northern Utilities Co., headquartered at Chicago, will be connected to the 24-inch carrier if a natural gas franchise being applied for by the company is granted

A lateral is under construction from the main line to serve Ottawa, Ill., a city of 16,000 population, now on manufactured gas service. Public Service Company of Northern Illinois, headquartered at Evanston, serves the town. This lateral will serve Streator, a city of 15,000 population. This company also is planning to serve natural or mixed gas in the following towns north of Chicago, where manufactured gas is being used: Antioch, Des Plaines, Fox Lake, Lake Villa, Round Lake, Volo, Lake Zurich, Wilmette, Kenilworth, Evanston, Franklin Park, River Grove, Wauconda, and others.

Western United Gas and Electric Co., headquartered at Aurora, Ill., will connect its plant at Joliet with the new transmission line and will serve a mixed natural gas throughout its system, which includes the following cities and towns: Batavia, Bensenville, Benton, Brookfield, Buckner, Carbondale, Carpentersville, Carterville, Christopher, Crystal Lake, Downers Grove, DuQuoin, East Dundee, Elmhurst, Geneva, Genoa, Harvard, Herrin, Hinsdale, Johnson City, LaGrange, Lombard, Marengo, Marion, McHenry, Murphysboro, Naperville, St. Charles, Villa Park, West Chicago, West City, West Dundee, Western Springs, West Frankfort, Westmount, Wheaton and Woodstock.

North Shore Gas Co. of Waukegan is changing its system to mixed natural and manufactured, this company supplying about 25 towns in Lake County, Ill.

Second Chicago Line to Get Under Way; May Be 30-Inch

According to reports from the press, Continental Construction Corp. expects to begin construction on a parallel gas line from the Hugoton and Texas Panhandle gas fields before the summer of 1932. The report states that this line will be of 30-inch pipe, and will carry gas to Chicago and points east.

The company is also said to have survey work under way on the line to extend from the Geneseo compressor station on the existing 24-inch carrier near Geneseo, Ill., to Milwaukee, Wis., via cities and towns in northern Illinois and southern Wisconsin. This line, according to the report, will be of 20-inch pipe, and will cost in the neighborhood of $3,000,000.

A feature describing the completion of the 24-inch line to Chicago from the Texas Panhandle will be found on page 26 of this issue.

Oklahoma City to Vote October 27 on Franchise Renewal

The city council of Oklahoma City has decided to submit to the voters of the city on October 27, a proposal for granting a new franchise to the Oklahoma Natural Gas Corp. of Tulsa. The present franchise of that company has still about three years to run. The council rescinded its former decision to submit in the same election a proposal to vote $4,000,000 in bonds to establish a municipal gas plant. The Oklahoma Natural proposal carries a top rate of 45 cents and a two per cent gross receipts payment on domestic gas sales.

Line from Pecos Field to Fort Stockton is Finished

Completion of the line from the Pecos Valley field to Fort Stockton, Texas, was scheduled for late in August. The main line was completed by the middle of the month, and progress was being made on the distribution system. The line will also serve Alpine and Marfa, Texas. Big Bend Pipe Line Co. built the line and gas will be served by the Fort Stockton Gas Co.

G. W. Steele Now Manager of Domestic Sales for Laclede

George W. Steele, for several years in charge of refrigeration sales of the Kansas City Gas Co., Kansas City, Mo., recently accepted the position of manager of domestic sales for the Laclede Gas Light Co., St. Louis, Mo. Mr. Steele has also assumed many of the duties of assistant sales manager.

Laclede Gas Light Co. Now Billing on the Therm Basis

The Laclede Gas Light Co. of St. Louis is now billing its customers under the therm. method instead of the volumetric system. The action of the company follows a recent order of the Missouri Public Service Commission granting permission to change to the therm method.

The rates to the customers are not affected by the change, except that in some cases the bill on the therm basis will be one cent more or less, on account of fractions.

A pamphlet sent out with the bills gave a comparison of rates figured on the volumetric system and the therm method. The new method is optional with the customer and anyone who desires may continue with the old system.

The present rates for 600 B.t.u. gas are as follows: First two therms, 80 cents; next 28, 15.7 cents a therm; next 300, 14.2 cents a therm; next 600, 12.5 cents a therm; in excess of 930, 10 cents a therm.

Brandon Plant to Be Purchased By National Light & Power Co.

Control of the manufactured gas plant in the city of Brandon, Manitoba, Canada, is likely to pass into the hands of the National Light & Power Co. of Moosejaw, Sask. It is reported that the company has made an offer of $1,398,000 to the Manitoba Power Commission recently for the Brandon power plant, manufactured gas plant, and central steam heating plant. The Manitoba government, it is reported, notified the power company that it will accept its offer, subject to a favorable ballot being cast by the citizens of Brandon.

North American Public Service Plans Line for Missouri Towns

The North American Public Service Co. of Omaha, Neb., is reported to be planning construction of a line to serve Cameron, Gallatin and Trenton from a field being developed by Frank E. Messler near Lathrop. It is stated that the company has 14,000 acres under lease in the area.

Franchise applications are contemplated by the company, according to report.

Line to Livingston and Bozeman, Mont., in Service

Montana Power Co.'s line from Dry Creek field to Bozeman and Livingston is complete and gas service has begun in those towns, as well as in Absarokee, Columbus and Big Timber. The line is approximately 120 miles long of 10- and 8-inch pipe.

Naylor Distributor for Texas-Louisiana District

Naylor Pipe Co., Chicago, Ill., announces the appointment of James K. Wilson as district sales manager for Texas and Louisiana, with headquarters at 305 Magnolia Building, Dallas, Texas.

Clarksburg to Get Service

Central States Gas Utilities Co., subsidiary of Panhandle Eastern Pipe Line Co. of Kansas City, Mo., reports that service began early in August at Clarksburg, Mo.

Panhandle Eastern Line Completed Aug. 18

BROKAW, DIXON, GARNER & McKEE, engineers in charge of the construction of the Panhandle Eastern gas line, announce that the line, 805 miles in length, from the Panhandle gas fields to Rockville, Ind., was completed August 18.

A line is now being constructed between Rockville and Muncie, Indiana, by the Ohio Fuel Co., a subsidiary of the Columbia Gas & Electric interests, which connects at Muncie with the Columbia's system extending through Ohio. At the completion of this unit it will be possible to deliver Panhandle gas to eastern users.

The remaining construction work to be done on the Panhandle Eastern project, as announced by Brokaw, Dixon, Garner & McKee, is in connection with lateral lines and on one remaining compressor station. About 400 miles of lateral and gathering lines has already been constructed, but some 60 or 70 miles of lateral are yet to be constructed under existing contracts. Work on the last of the three compressor stations located south of Springfield, Ill., is now being brought to completion. Other compressor stations are located at Liberal, Kan., and one south of Kansas City.

About 60 towns and municipalities will be served by the Panhandle Eastern line, including Hartford, Waverly, Williamsburg, Arlington, Bloom, Bucklin, Burns, Elbing, Iuba, Kingsdown, Kismet, Minneola, Mullinville, Preston, Turon, and White Water, Kan.; Bowling Green, Boonville, Centralia, Farber, Hallsville, Jefferson City, Laddonia, and New Franklin, Mo.; and Gruver, Texas.

Towns reported by the press to be scheduled for service in Illinois include Jacksonville, Springfield, Danville, Bloomington, Champaign and Urbana.

B. C. Electric to Build $850,000 Plant

THE B. C. Electric Power and Gas Co., Ltd., has just placed a contract with the Gas Chambers and Coke Ovens Limited of London, England, for the installation of an intermittent vertical chamber oven plant of daily manufacturing capacity of 3,000,000 cubic feet, to be completed and making gas by November, 1932.

Work will start within a month or two and continue throughout the winter. Continued increase in the demand for gas is the reason for the new plant, company officials state.

It is expected that new industrial heating installations will add 8 million cubic feet a year to the demand in Vancouver, and North Vancouver will require 6 million feet more when mains are laid across the Second Narrows.

Construction of the new plant will be supervised by J. Keillor, gas engineer of the B. C. Electric Power and Gas Co., Ltd. It will consist of 24 vertical chambers, each taking 4½ tons of coal intermittently charged and discharged, waste heat boilers, coal bunkers, equipment for handling, quenching, screening, and conveying coke, etc. A feature of the new plant will be its ability to produce metallurgical coke for which there is now a demand of only a few thousand tons a year. It will be the first plant in Canada to produce coke of this kind.

Another distinct advantage possessed by the new equipment lies in the fact that the ovens will be heated by producer gas made in outside automatic producers, eliminating the old method of heating and retorts by individual hand-fired producers under each bench. The type of automatic producers to be used is specially adapted to the use of high ash coke. The new plant is expected to consume 30,000 tons of coal a year.

Contracts for auxiliary equipment such as condensers, exhausters, tar extractors, scrubbers, purifiers, napthalene washers, of the same capacity, will be placed shortly. The entire plant, costing in the neighborhood of $850,000, is to be erected on the Carrall street site near the 3,000,000 cubic feet waterless gas holder and purifying unit erected two years ago by the company, and will be the first unit of a 25,000,000 cubic feet a day installation announced at the time the new holder was built.

Appalachian Gas Corp. Acquires Empire Corporation

O. H. SIMONDS, president of Appalachian Gas Corp., and Floyd W. Woodcock, president of Empire Corp., jointly announce the acquisition by Appalachian Gas Corp. of a controlling interest in the Empire organization. The latter corporation, through subsidiaries, renders electric power and light, natural gas, telephone, water and ice service in more than 250 communities in nine states. Mr. Woodcock will continue as president of Empire Corp. and will be elected a director and vice-president of Appalachian Gas Corp.

With the acquisition the total assets of the companies in the Appalachian Gas Corp. group will be in excess of $80,000,000 and will have gross annual revenues in excess of $10,000,000.

Empire Corp. is the fourth unit to become embraced in Appalachian Gas Corp. group since the beginning of the year, and the 12th since the corporation's organization less than two years ago.

This year's acquisitions include Commonwealth Gas Corp., Monroe Consolidated Gas Co. and Union Management and Engineering Corp. Gross business of Appalachian Gas Corp. group companies, including the Empire organization, for the year ended May 31, 1931, was 54.2 per cent natural gas, 21.8 per cent electricity and the balance water, telephone and miscellaneous services.

Sioux Falls Gas Co. Getting Ready for "Natural"

Sioux Falls, S. D., will have natural gas by October 1, according to a statement credited to S. D. Whiteman, general manager of the Sioux Falls Gas Co. Supply will come from the Lincoln-Sioux City extension of the Northern Natural Gas Co.'s major carrier. The line will be 16-inch and will extend north from Sioux City, Iowa. Sioux Falls Gas Co. plans to spend about $200,000 in the city, installing mains and changing over to natural from manufactured service. Towns along the route of the line also will be connected to the 16-inch main, including Elk City and Yankton. Franchising activity is progressing in many other cities and towns in the area.

MEASUREMENT and CONTROL

Measurement of Gas at High Altitudes

By RALPH L. COOK
*Southern California Gas Company**

THE effect of atmospheric pressure on the measurement of gas has already developed considerable discussion, and several papers on the subject have been presented before other associations. This paper will summarize material which has been presented to date, and it is hoped that some value will result through treating the topic from a new viewpoint. The author wishes to give due credit to John Diehl of the American Meter Co. for information furnished. Also, to Bulletin S-282 of the California Natural Gasoline Association, entitled "Absolute Pressure for Natural Gas Measurement," will be referred to, as well as the report of the Committee on Natural Gas Measurements of the Pacific Coast Gas Association, which appears on page 367 of the 1927 Proceedings of that Association. F. A. Hough served as chairman of that committee. Some information also has been obtained from Bulletin 42, entitled "Correction Factors for Gas Volumes and Properties of Gases," of the Connersville Blower Co.

R. L. Cook

"Gas is almost universally measured by volume. Unlike a solid or liquid, any amount of gas always completely fills the space in which it in confined. It is therefore impossible to change the volume of gas contained in a measure without changing the capacity of the measure; and such measure must, of course, be closed on all sides. The gas-measuring devices in common use are almost all so designed that the pressure and temperature of the gas are kept nearly constant, while the volume occupied varies automatically when gas is introduced or withdrawn. This is accomplished as a direct measurement either by the use of a containing vessel with collapsible walls operatabove which the gas is confined, as in the ordinary dry meter, or by partially or completely filling the container with a liquid above which the gas is confined, as in the gas burette, wet meter, cubic-foot bottle, and meter prover, or by rotary displacement meters.

"There is also a group of instruments by which the volume or mass of gas can be measured indirectly by measurement of one or more of the natural or acquired properties of the gas as it flows through the apparatus. To this group belong the pitot meter, the venturi meter, the orifice meter, the Thomas meter, the anemometer, etc."

From the foregoing, quoted from the Connersville Blower Co.'s bulletin, it may be seen that first a definite measure must be established. This has been done in southern California with the adoption of the standard cubic foot.

The standard cubic foot is defined as that quantity of gas, saturated with water vapor, which at a temperature of 60° F. and under a pressure of 30 inches of mercury at 32° F. (14.733 pounds per square inch) occupies a volume of 1 cubic foot.

Due to the fact that gas is a compressible fluid, following the law of Charles and closely that of Boyle, to obtain the true volume in cubic feet passing any measuring device it is necessary to correct the readings made directly or indirectly on the meter to the standard conditions as set forth.

By reference to the definition of the standard cubic foot it may be seen that a definite measure has been set forth which may be duplicated at any time. A standard cubic foot must contain by contract a minimum number of heat units. By correcting the indicated volume to the standard we then furnish the consumer with a definite minimum number of heat units in every cubic foot that he purchases.

Table No. 1 gives the relative weight and heat content of 1 cubic foot of gas (having a specific gravity of 0.60 and a temperature of 60° F.) at various pressure bases, assuming that a cubic foot of this particular gas contains 1,000 B.t.u.'s at 14.73 pounds absolute:

This table shows that as the absolute base pressure increases, the weight per cubic foot increases, and as the base pressure decreases, the weight per cubic foot decreases.

The above values of the weight of gas may be calculated by use of the following formula, multiplied by the specific gravity of the gas in question. This formula is taken from Kent's Mechanical Engineers' Handbook, 10th edition, page 657:

$$W = 0.080728 \times \frac{P}{14.6963} \times \frac{491.6}{459.6 + T}$$

where 0.080728 is the weight of one cubic foot of pure air at 32° F. and 29.92 inches of mercury or 14.6963 pounds atmospheric pressure

P = the atmospheric pressure
and T = the temperature.

It is not the purpose of this paper, however, to dwell upon the subject of the pressure base standard, inasmuch as it has been adopted for general use. It is desired, however, to point out that a definite difference exists in the standard pressure base for gas measurement and the effect of atmospheric pressure upon gas measurement.

The fundamental formula for the flow of fluids is

$$V = \sqrt{2gh}$$

This is developed into the general orifice meter formula

$$Q = C\sqrt{hP}$$

by means that are familiar to all.

This is quoted to impress upon all that the material which has gone before in this paper has to do with the quantity which is controlled by the factor "C" in the formula above.

This formula states that the quantity of gas is equal to a coefficient times the square root of the product of the differential in inches of water and the absolute pressure in pounds per square inch.

The differential pressure is the difference in pressure between the upstream and the downstream taps in the case of the orifice meter.

*Presented before the Southern California Meter Association, August 27, 1931.

TABLE NO. 1. WEIGHT AND HEAT CONTENT OF A CUBIC FOOT OF GAS

Base Pressure (Pounds Absolute)	Weight at 60° F. (Pounds)	B.t.u.'s at 60° F.
12.4	0.03936	843
13.0	0.04126	885
14.4	0.04490	979
14.7	0.04583	1000
15.2	0.04739	1034

Cook and Cereghino on August Program

THE August meeting of the Southern California Meter Association was scheduled to be held at Long Beach, August 27. Following dinner at the Breakers Hotel an interesting program was arranged, comprising two papers on important measurement topics.

Ralph L. Cook of the Southern California Gas Co. was to speak on "Measurement of Gas at High Altitudes", this paper being published in the current issue.

"Recent Developments in Measurement Station Design" was the title of a discussion to be presented by M. J. Cereghino of the Los Angeles Gas and Electric Corp.

During the past month the Association directorate, headed by P. W. Hill, president, has been active in organizing committee membership and the program of work for the year ahead. Announcement of the new committee roster will be made in next month's issue of *Western Gas*.

The absolute pressure is the sum of the atmospheric pressure and the gauge pressure. Thus it may be seen that the atmospheric pressure has a very marked effect upon measurement.

The atmospheric pressure should be an average taken at the point of measurement, and for all practical purposes may be considered as entirely due to elevation above sea level. It is recommended that the values be used as shown in the report of the Gas Measurement Committee of the Pacific Coast Gas Association in the Proceedings mentioned above.

If the foregoing formula is used for all orifice meter work, the standard tables of pressure extensions may be used unless the variation from 14.4 pounds is too great. This variation is greater at a vacuum or the lower pressures than at higher values of the static pressure.

To obtain the true quantity of gas for which the consumer may have contracted, a correction factor must be applied. By quantity we mean a volume of gas which will give the heat units for which he has contracted and not necessarily the number of cubic feet which have passed the meter according to the recording of the chart.

The accompanying graph (Fig. 1) shows a convenient method of applying such a correction. At an elevation of 2,361 feet the average atmospheric pressure has been determined as 13.5 pounds per square inch. By reference to the orifice meter formula

$$Q = C\sqrt{hP}$$

we find that the extension tables in general use are based on an atmospheric pressure of 14.4, or

$$Q = C\sqrt{h\,(p + 14.4)}$$

Obviously, then, if 13.5 is the atmospheric pressure at the point of measurement, the above cannot give a true value if we think of the gas delivered in pounds or B.t.u.'s.

For example, assume $C = 1{,}000$, $h = 10$ inches and $p = 25$ pounds. Then

$Q = 1000\sqrt{10 \times (14.4 + 25)} = 19{,}850$ cu. ft. This would be the quantity in cubic feet if the above were taken from the extension tables. However, the atmospheric pressure is only 13.5 pounds.

$Q = 1000\sqrt{10 \times (13.5 + 25)} = 19{,}620$ cu. ft. which is the true number of cubic feet which will give the consumer the value in pounds of gas or B.t.u. for which he has contracted.

We may, therefore, apply a factor

$$F = \sqrt{\frac{P+13.5}{P+14.4}}$$

and use the standard extension tables. The factors may be determined for any average atmospheric pressure and the true gas volume calculated by direct multiplication.

If it is desired to adjust the difference so that no correction is necessary in the calculations, the static pressure spring may be raised or lowered by the difference between the true atmospheric pressure and 14.4 pounds, when that pressure is below or above that used in the extension tables.

Direct reading charts have the advantage of taking care of any adjustment in the pressure spring; therefore, no further correction is necessary.

There is one other error which is introduced when the elevation is great. This is usually disregarded, as the difference is very small, but it is sometimes considered. This error arises from the influence of elevation and latitude on the value of "g" in the fundamental flow formula. For ordinary purposes

$$V = \sqrt{2gh}$$

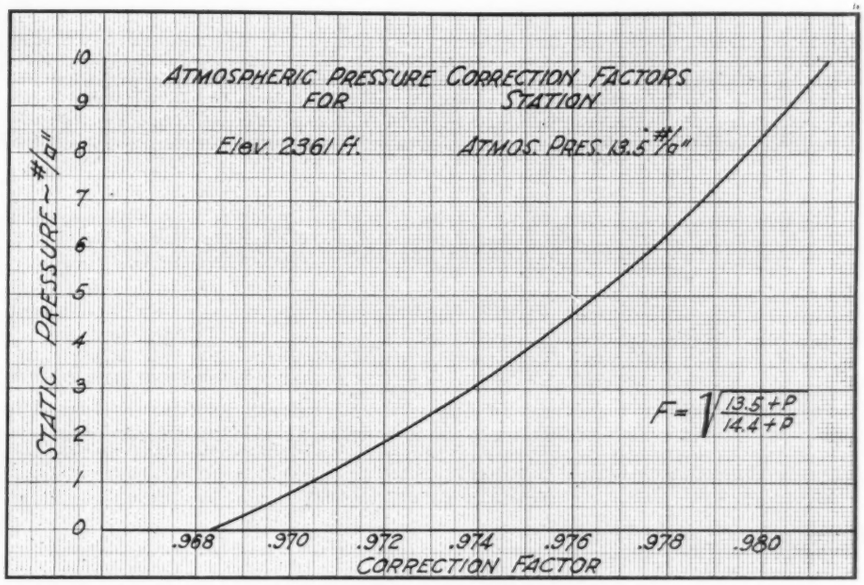


Fig. 1.

and "g" equals 32.2, the acceleration due to gravity in feet per second per second.

The common equation to determine the value of "g" at any elevation and latitude is:

$g = 32.0894\ (1 + 0.0052375 \sin \text{lat.})\ (1 - 0.0000000957\ e)$ where lat. = latitude of the station and e = elevation above sea level.

A more complicated equation is given for those who wish to delve into the subject further. This is Hemet's equation, sometimes known as the Laplace or hypsometric formula:

$$h - h_o = 18400\ (1 + 0.00367\ t)\ \left(1 + 0.378\ \frac{e}{p}\right)\ (1 + 0.0026 \cos 2 \text{ lat.})\ \left(1 + \frac{h + h_o}{6370191}\right)\ (1 + 0.00157) \log \frac{P_o}{P}$$

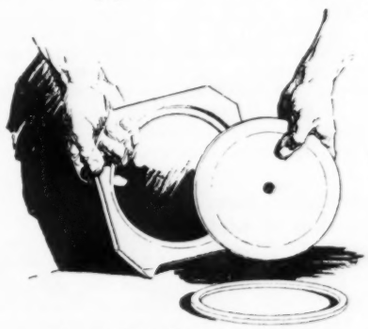
where t = average temperature
e = average vapor tension of the layer of air
P = barometric pressure at top of stratum
P_o = barometric pressure at bottom of stratum
lat. = latitude of the station
h = elevation above sea level of the lower limit of stratum
h_o = elevation above sea level of the upper limit of stratum.

All that has been said in this discussion applies to flow meter measurement, but the readings of any positive type meter should also be corrected to deliver the true weight of gas as called for by contract. In other words, the correct amount of heat units will be delivered only when the temperature of the gas is 60° F. and the absolute pressure within the meter is 14.733 pounds. For any other pressure a factor must be applied which is

$$F = \frac{P}{14.73}$$

where P is the atmospheric pressure at the point of measurement plus the gauge pressure. If a direct reading meter is used the volume shown must be multiplied by the above factor.

New Type Orifice Plate*



Removable disc orifice plate. (Patent applied for.)

THE orifice plate here described was designed for use with the Robinson type of orifice fitting.

The plate is comprised of a plate holder and ring. The plate holder is machined down so that the thin plate disc is centered; the seat is narrowed, providing a positive seal; the ring locking the plate on the holder is tapered on the bottom. The ring is slightly higher than the holder, thus acting as a metal gasket against the orifice fittings. In order that the ring will maintain its smoothness (unless handled carelessly) it is made of non-corrosive metal. The plate holder and plate itself are cadmium plated to pre-

*The orifice plate under discussion was described by its designer, Gordon Greene of the Associated Oil Co., before the July 23 meeting of the Southern California Meter Association.

vent corrosion. The new type plate is of light construction, simplifying the problem of transportation and possible damage to the orifice in handling.

Tests made on different size lines using this new type plate show differential readings which check very accurately against the old type plates. A 6-inch Robinson fitting was rigged up with a flange and a bull plug on the upstream side (the same side as the set screws) where a high water pressure connection was attached, and it was then possible to put in a new type plate holder with a blank disc, testing it for leakage to 250 pounds pressure. The plate held without showing any appreciable leakage.

Putting the Spotlight on Cake Baking

(Continued from Page 33)

predicted for each of them a happy home when they begin to establish domiciles of their own.

The entire project had a number of important and interesting end-results:

1. It was subject for editorial comment, especially in reply to critics of the present generation of girls. The Fullerton Tribune, for example, rebuked such critics, locally, by calling attention to the fact that more than 200 of the local high school girls had baked cakes for their local contest, thus demonstrating that the girls of today still cling to the home-making characteristics of former generations.

2. Parents, generally, have been glad that the domestic tendencies of their daughters had been stimulated through the medium of these contests.

3. High school officials enthusiastically commented upon the manner in which the contests were conducted and the attitude consistently maintained by our company as set forth above.

4. Approximately 6,000 high school girls had their interest and their proficiency in cake-baking created, or renewed, through the medium of this project, and more than 3,000 actually participated by bringing cakes to their local high school contests. It is estimated that between 15,000 and 20,000 cakes were baked, directly as a result of this idea.

Fundamentals of Combustion Control

(Continued from Page 36)

fifth run may show less than the fourth, but a regular rise will be noted. The average will give a clear indication of the condition of the fire. The tests about the middle of the fire being most helpful, those towards the end are mostly to determine when the fire has "run out." Tests on the first coking or two are of little value, as the steam then will almost always be well used up.

To balance a machine the easiest procedure is to set some definite amount of gas per run to be made, depending on the rated capacity of the set. Then multiply this number of M. cu. ft. of gas by about 35. This gives an average figure for the pounds of steam per run, and dividing this by the length of the run in minutes gives the pounds of steam per minute.

Set the steam at this figure and then test the CO_2 on the run to see if the steam is being taken up. If it is, try adding more steam. If it is not, test the blast and see if it can be made to take it up. If this cannot be done it may be necessary to cut the length of the run or the steam.

In conclusion it may be added that a number of tests will always be more informative than a single test on any type of furnace. After a certain amount of experience with the instrument, the operator will not have any doubt as to the correctness of any changes that he may make by means of its readings.

W. H. Crutcher, Prominent in Oklahoma Utilities, Dies

William H. Crutcher of Muskogee, eastern division manager of the Oklahoma Gas & Electric Co., died on July 28, following a heart attack. Mr. Crutcher has been in Muskogee 8 years, coming from Oklahoma City, where he was manager of gas operations for the Oklahoma Gas & Electric Co. He was prominent in Oklahoma utility circles for 13 years, having come to the state in 1918.

Mr. Crutcher was one of the founders of the Southwestern Gas Measurement Short Course, held annually at the state university at Norman.

S. W. Newman to Head Gas Appliance Society

S. W. Newman, president of Charles Brown and Sons, has been unanimously elected as president of the San Francisco unit of the Gas Appliance Society of California, with Phil Harris, of Redlick Newman Co., as vice-president, and Graydon A. Milton, of the Pacific Gas and Electric Co., as secretary. Directors for the year include the following: J. H. Lindenmeyer, Roy Stanforth, George Tuck, Henry Bostwick, William Mixter, H. Woodmansee, Harry Spicer, Guy Farwell, H. A. Hilmer and J. J. McFarland.

O. C. Bunster, of the Sterling Furniture Co., is state president of the Gas Appliance Society, of which G. P. Egleston is vice-president. Directors of the state society include J. A. Werner, Edward Lachman, H. W. Jackson, L. J. Breuner, H. M. Crawford and Frank K. Runyan.

Worthington Acquires Ownership of Metalweld

Worthington Pump and Machinery Corp., Harrison, N. J., has acquired the manufacturing and marketing facilities of Metalweld, Inc., Philadelphia, Pa., builder of a complete line of portable compressor units. This will enable Worthington to supply all air equipment requirements of contractors, railroads, utilities and industrial users.

Worthington's Feather valve compressors are specified as equipment for Metalweld portable units. The portable compressors will be manufactured at the Harrison, N. J., works of the Worthington Pump and Machinery Corp., and the engineering, manufacturing and sales personnel of the Metalweld organization also will be located there.

T. L. Losby Named Sales Promotion Representative for No. States Power

H. E. Young, vice-president in charge of sales for Northern States Power Co., Minneapolis, Minn., recently announced the appointment of T. L. Losby as special merchandise sales promotion representative. Mr. Losby was formerly with the customer's survey department, leaving the company in 1927 to accept a post as secretary of the Minneapolis Electrical League, later occupying a similar position with the Cleveland Electrical League.

Kansas Pipe Line & Gas Co. Asks Belvue Franchise

The Kansas Pipe Line & Gas Co., Salina, Kan., has applied for a franchise to serve the town of Belvue, Kan., with natural gas. Supply would come from the Stanolind oil line traversing the territory, now being reconditioned for natural gas service.

Louisiana Power & Light Co. Signs $700,000 Contract

Louisiana Power & Light Co., headquartered at New Orleans, La., has signed a 3-year contract with the Celotex Co. to deliver gas at the plant of the latter company. It is reported that the contract, at minimum rates of consumption, will amount to about $700,000 in revenue for Louisiana Power & Light.

1931 Calendar

September

Pacific Coast Gas Association—38th Annual Convention, San Francisco, Calif., August 31 to September 5, 1931.

Appliance Division, Manufacturers Section, American Gas Association—Detroit, Mich., September 17-18, 1931.

Southern California Meter Association—September 24, 1931.

October

American Gas Association—13th Annual Convention, Atlantic City, week of October 12, 1931.

20th Annual Safety Congress and Exposition, Chicago, Ill. October 12-16, 1931.

November

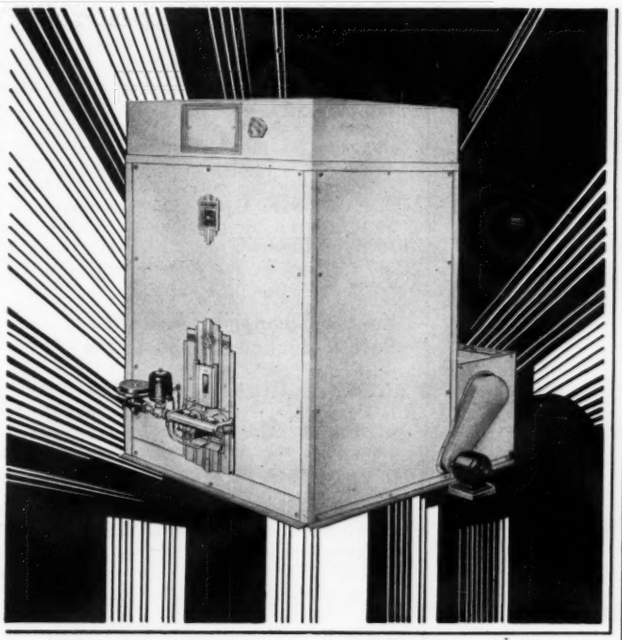
American Petroleum Institute, Chicago, Ill., November 10-12, 1931.

Third Annual Conference on Bituminous Coal—Pittsburgh, Pa., November 16-21, 1931.

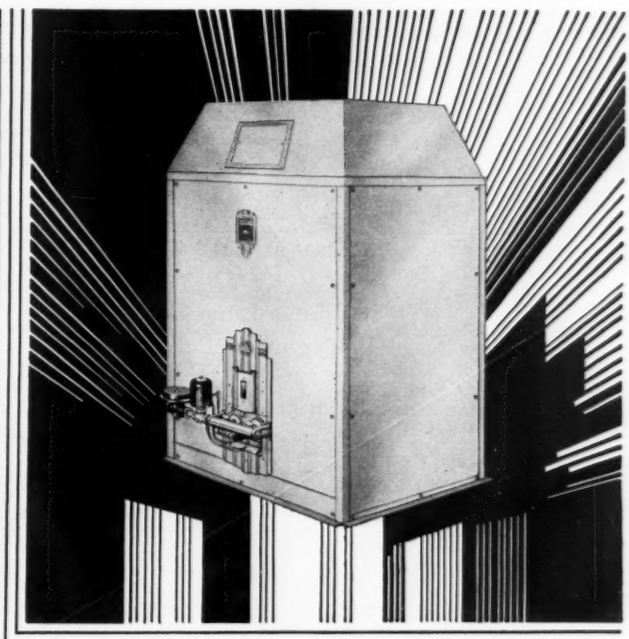
NEW APPEARANCE

THAT COMPLIMENTS

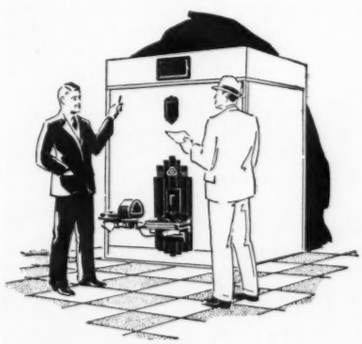
THE MODERN BASEMENT



HEATMASTER



COLUMBUS FURNACE



The public is recognizing and demanding the advantages of Automatic WARM AIR Heating! Architects and builders are recommending it as the truly modern method of home heating. Fully Conditioned Air, so much in vogue, can be obtained only with automatic warm air systems. The Gas Industry has been quick to recognize and foster this trend. Capitalize on this sweeping movement to WARM AIR with the Columbus and Heatmaster Furnaces . . . with that modern appearance that conforms so well to today's demand for livable basements.

Surface Combustion

SURFACE COMBUSTION CORPORATION
TOLEDO, OHIO.

SALES AND ENGINEERING SERVICE
IN PRINCIPAL CITIES

Western Distributors—Natural Gas Equipment, Inc.—Los Angeles—San Francisco

Half Year Totals Show Sales Increases for Pacific Slope Utilities

THE accompanying table, based upon information collected by the Pacific Coast Gas Association, sets forth the consolidated totals of gas production, customers, sales and gross revenue of gas utilities operating in Pacific Slope territory. The figures compare operations in the first six months of 1931 with those of the same period a year ago.

It will be noted customers have increased by 35,056 or 2.2 per cent since June 30, 1931. Half year sales of gas in cubic feet have increased by 1.6 per cent as against an increase of only one-tenth of one per cent in the first quarter, indicating that ground lost by the introduction of high heating value natural gas in northern California is being rapidly regained. Gross revenues from gas sales are 4.2 per cent less than in 1930.

Gas companies of this territory have extended their service by laying 1,782 miles of transmission and distribution pipe lines during the year.

CONSOLIDATED GAS UTILITY OPERATIONS

In States of Arizona, California, Idaho, Nevada, Oregon and Washington, and Province of British Columbia

First Half of 1931 Compared With Same Period of 1930

	First Six Months 1930	*First Six Months 1931*
Gas Produced and Purchased		
Water Gas	1,673,938	1,537,340
Coal Gas	828,267	780,997
Oil Gas	11,806,281	4,316,789
Coke Oven Gas	329,128	320,318
Butane Gas (550 B.t.u. Basis)	.....	56,238
Natural Gas	62,444,428	77,798,023
Total	77,082,042	84,809,705
Customers, June 30		
Total Domestic and Industrial	1,583,289	1,618,345
Sales (M.c.f.)		
Domestic	35,032,678	34,335,412
Industrial	35,117,276	37,289,416
Total	70,149,954	71,624,828
Gross Revenue From Sales		
Domestic	$32,726,325	$31,380,661
Industrial	8,562,597	8,170,935
Total	$41,288,922	$39,551.596
Miles of Mains, June 30	23,113	24,895

A. G. A. Laboratory Branch Reports on First Three Months Operation

FOLLOWING completion of the first three months of operation of the Pacific Coast Branch of the American Gas Association Testing Laboratory, officials of the laboratory made a report of activities of the new branch, which is located in Los Angeles, Calif. Full approval testing was authorized by the A.G.A. executive board on May 2, although that fact was not generally known among manufacturers until early in June. During the month of May there were four appliances tested for approval. In June this number increased to 19, and on July 25, 64 appliances had been tested for approval. The total number of appliances approved by tests and inspection during this period amounted to 89. By the end of June Pacific Coast manufacturers had filed applications for test on 154 appliances. This number was increased considerably during July.

There are approximately 105 gas appliance manufacturers in the Pacific Coast region, the majority of whom are members of the American Gas Association. Twenty-three manufacturers submitted appliances for approval during the first three months of the Branch Laboratory's activities.

In all cases the same type of equipment is being used at both the Pacific Coast Branch and the main laboratory in Cleveland, and the three test gases used at the Pacific Coast Branch have characteristics similar to those used at the Cleveland laboratory.

Both gas company and manufacturer executives in the western coast territory have shown considerable enthusiasm about the Pacific Coast Branch Laboratory and through their cooperation have assisted greatly in its establishment.

Two Companies Bidding For Vinita Gas Franchise

The city council of Vinita, Okla., has adopted an ordinance authorizing submission to the vote of the townspeople of a gas franchise to LaDow and Stryker Brothers of Fredonia, Kan. The franchise provides for a rate of 50 cents per M.c.f. for domestic gas. The city council also advanced to second reading a proposed franchise of the Vinita Fuel Co., which offers a top domestic rate of 48 cents for main line gas and 35 cents for local field gas. The company, which is now serving Vinita, recently reduced its rates in the city to 50 cents for main line gas and 40 cents for local field gas for domestic purposes.

Increase in Net Earnings for San Diego Consolidated G. & E.

San Diego Consolidated Gas and Electric Co., San Diego, Calif., a subsidiary of Standard Gas and Electric Co., Chicago, reports a gain of $291,749 in the net earnings of the company for the 12 months ended June 30, 1931, over the previous 12-month period. Net earnings for the period ending in June of this year were $3,759,359, as compared with $3,467,610 for the previous 12 months. Gross earnings reported in June, 1931, were $7,-369,853 and in June, 1930, were $7,241,734.

Kansas Companies Announce Rate Reductions in 250 Towns

Four subsidiaries of North American Light & Power Co., serving more than 250 towns in Kansas, have filed voluntary rate reductions with the state Public Service Commission. The reductions amount to approximately 14 per cent on the basis of the first 5.000 cubic feet. The companies in whose districts the rate change will be effective are: Kansas Pipe Line & Gas Co., Kansas Power & Light Co., the Western Gas Co. and the Kingman County Gas Co.

Hoffman Now on Executive Staff of Central Public Service Corp.

R. C. Hoffman, Jr., vice-president of Southern Cities Public Service Co., a subsidiary of Central Public Service Corp., Chicago, has been made a member of the general executive staff of the parent company, and has moved his offices to Chicago. In addition to his new work, Mr. Hoffman will retain complete direction of the operating companies included in the Southern Cities group, made up of about two score gas utilities in the south.

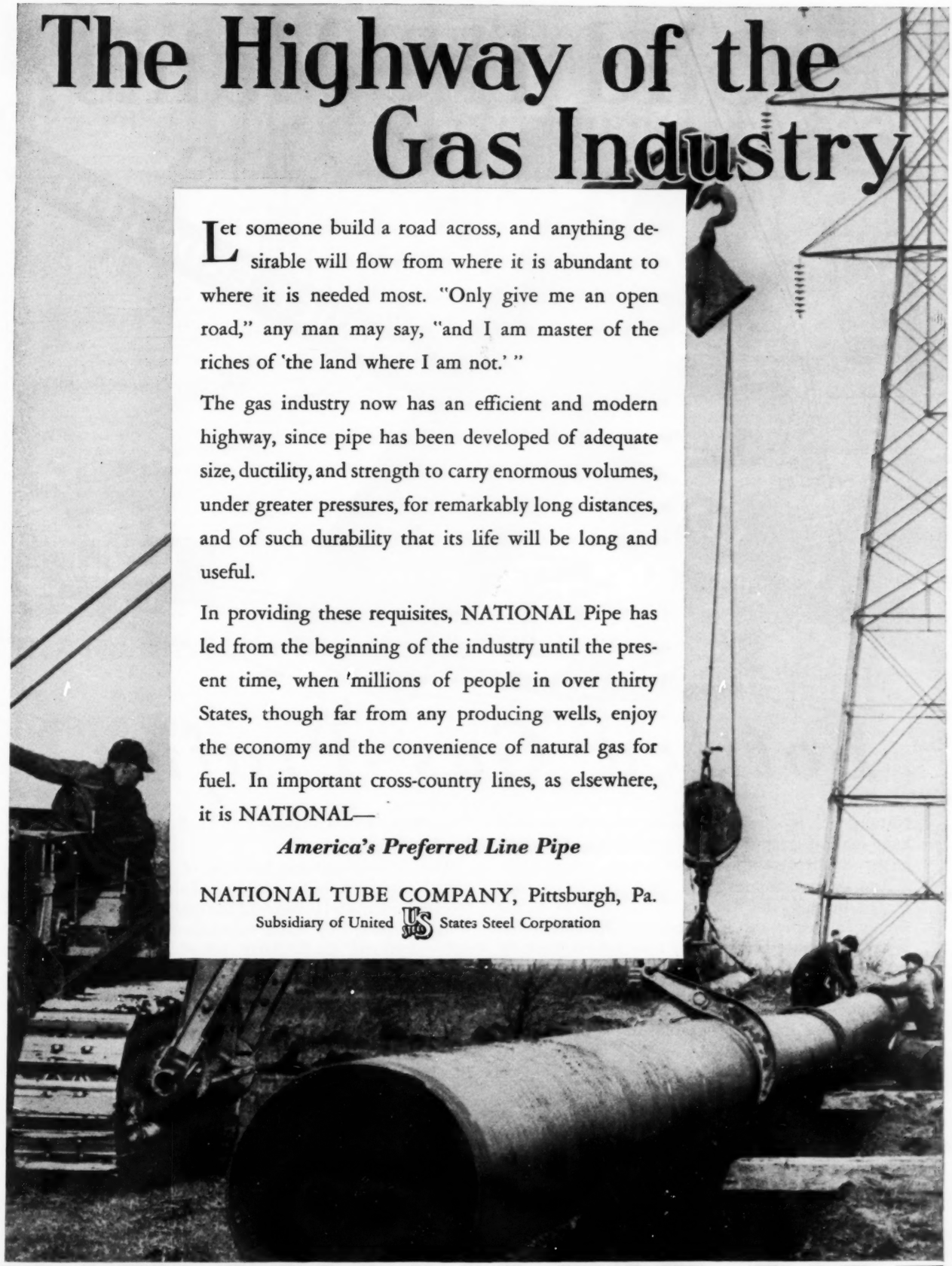
Pacific Gas and Electric Co. Reports Earnings Gain

Pacific Gas and Electric Co., San Francisco, and subsidiaries report consolidated net profits for the six months to June 30, 1931, of $11,956,386, as compared with $11,-731,158 for the previous year. This amount represents net profits after all charges equal after preferred dividend requirements, and shows a gain of $225,228.

To Extend Service to Scandia

Plans are practically complete for an extension of gas service from Belleville, Kan. to Scandia, by the Kansas Pipe Line & Gas Co., Salina, Kan. The line will be of 3-inch pipe.

The Highway of the Gas Industry



Let someone build a road across, and anything desirable will flow from where it is abundant to where it is needed most. "Only give me an open road," any man may say, "and I am master of the riches of 'the land where I am not.' "

The gas industry now has an efficient and modern highway, since pipe has been developed of adequate size, ductility, and strength to carry enormous volumes, under greater pressures, for remarkably long distances, and of such durability that its life will be long and useful.

In providing these requisites, NATIONAL Pipe has led from the beginning of the industry until the present time, when millions of people in over thirty States, though far from any producing wells, enjoy the economy and the convenience of natural gas for fuel. In important cross-country lines, as elsewhere, it is NATIONAL—

America's Preferred Line Pipe

NATIONAL TUBE COMPANY, Pittsburgh, Pa.
Subsidiary of United States Steel Corporation

NATIONAL LINE PIPE

Beyond The Mains?

Bottled Gas-Profits

Natural gas is now being made available to that huge market lying outside the territory which can be served effectively with pipe lines.

And every company, directly or indirectly concerned in the sale, use, or distribution of gas is keenly interested in this latest development which is gaining greater and greater momentum week by week and month by month.

Already the distribution of gas compressed into cylinders—commonly called "bottled gas"—has been proved highly profitable and a number of plants have been installed.

Hackney Seamless Steel Cylinders have received the popular acceptance of such companies as S. O. of California, Shell Petroleum Corporation, Skelgas Co., Hope Construction and Refining Co., and Philfuels Corporation.

This is only natural because of Hackney's 26 years' experience in the building of similar seamless steel cylinders and because of the extensive research work conducted by Hackney engineers in developing containers particularly suited for handling "bottled gas."

We suggest that you consult with us or with Mr. J. A. Barr of our California office regarding the results of Hackney's investigations in this field and the extreme adaptability of Hackney Seamless Steel Cylinders for handling these products. See Mr. Barr at the convention—or you can reach him by writing direct to the California office, listed below.

PRESSED STEEL TANK COMPANY

1183 Continental Bank Bldg. . . Chicago
5781 Greenfield Avenue . . Milwaukee, Wis.
1359 Vanderbilt Concourse Bldg. . New York
497 Roosevelt Building . . . Los Angeles

Hackney
MILWAUKEE

BUTANE - PROPANE NEWS

Covering Liquefied Petroleum Gas Service

CONSIDERABLE progress has been made toward formulating good practice in the design, construction and installation of containers for storing and handling liquefied petroleum gases—particularly through the auspices of the Compressed Gas Manufacturers' Association. A report on this subject, primarily representing the work of a special committee of the Compressed Gas Manufacturers' Association, was given at the recent annual convention of the National Fire Protection Association, under the auspices of that organization's committee on gases. The general report of the committee on gases also contained divisions on city gas and mechanical refrigeration, only the sections on liquefied petroleum gas being published below.

A preface to the report points out that these are probably the first rules written around and involving the construction and use of unfired pressure containers initiated by the National Fire Protection Association.

The committee's presentation was accepted as a progress report, final endorsement to be made a year hence, to allow for any desirable modifications and additions. Readers of "Butane-Propane News" will find the report valuable in its preliminary form, the subject being one which deserves close attention by those concerned with the development of approved practices in this new field.—*Editor.*

Formulating Regulations for Storage and Handling Equipment

Regulations for the Design, Installation and Construction of Containers and Pertinent Equipment for the Storage and Handling of Liquefied Petroleum Gases.

Introduction

THE rapid increase in the use of liquefied petroleum gases for domestic use and the increasing use of these gases by industry has brought about an urgent need for suitable regulations to govern the location, capacity and construction of bulk storage containers such as are employed in connection with cylinder filling and where the gas is stored and processed for distribution through underground pipes to points of consumption.

The various domestic uses of these gases are well-known, and as a matter of general information the following typical industrial uses of these gases are cited:

1. Heat Treatment Processes.
2. City gas enrichment.
3. Melting pots in printing plants.
4. Carbonizing processes.
5. Glass Works.
6. Gas fired refrigerators and refrigeration cars.
7. Coffee and nut roasting.
8. Carburizing.
9. Lead burning and related uses.
10. Solvents in rubber, lacquer and paint industries.
11. Drying operations—laundries, tailoring shops, textile plants, etc.

The Interstate Commerce Commission defines a compressed gas as any material with a gauge pressure exceeding 25 pounds per square inch as 70° F.; or any liquid flammable material having a vapor pressure exceeding 40 pounds per square inch, absolute, at 100° F., March to October inclusive, or exceeding 45 pounds per square inch, absolute, at 100° F., November to February inclusive.

The composition of liquefied petroleum gases varies, but in all of the established grades, the predominant compounds are propane and butane (iso-butane and normal butane). Under moderate pressure these gases liquefy, but upon release of the pressure are readily converted into the gaseous phase. Advantage of this characteristic is taken by the industry, and for convenience the gases are shipped and stored under pressure as liquids. When in the gaseous state these gases present a hazard comparable to any flammable natural or manufactured gas, except that being heavier than air, ventilation requires added attention. In the liquid phase the hazard presented is similar to that of a flammable liquid, somewhat modified by its more rapid vaporization.

As a matter of information it is pointed out that the Interstate Commerce Commission regulates the interstate shipment of these liquefied petroleum gases, and prescribes rigid specifications for the construction of containers. These regulations and container specifications are contained in pamphlet No. 9 of the Bureau of Explosives.

1. Application of Rules:

(a) The following regulations and storage container specifications are intended to apply to systems utilizing liquefied petroleum gases when stored in other than portable containers.

(b) Such application shall include gas plants for industrial or domestic uses when these gases are stored in non-portable containers, and where the gas may be transferred to portable cylinders for distribution to the consumer, or where the gas may be vaporized and distributed through gas mains to points of consumption.

(c) In systems outlined in paragraph (b) where the gas is distributed through mains, the regulations for the Installation of Piping and Fittings for City Gas shall apply to that part of the system located beyond the storage plant.

In systems where the gas is supplied and stored in portable containers, such containers shall be located in accordance with the regulations for the Installation and Operation of Compressed Gas Systems other than Acetylene for Lighting and Heating.

(d) These regulations and specifications are not intended to apply to marine terminals, natural gasoline plants, refineries, tank farms and other related plants for the manufacture, storage and handling of liquefied petroleum gases located outside the limits of incorporated communities.

2. Storage Container Classification:

Storage containers shall be classified as follows:

Class A—For gases with vapor pressure at 100° F., not in excess of 75 lbs. per square inch gauge.

Class B—For gases with vapor pressure at 100° F., greater than 75 lbs. per square inch gauge and not more than 125 lbs. per square inch gauge.

Class C—For gases with vapor pressure at 100° F., greater than 125 lbs. per square inch gauge, and not more than 200 lbs. per square inch gauge.

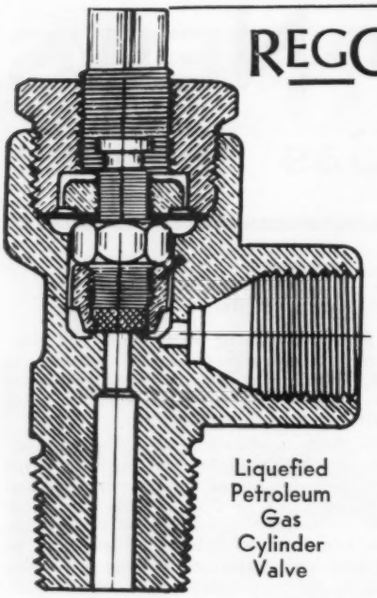
Note: Class A containers are suitable for commercial butane having an approximate vapor pressure of 65 pounds per square inch gauge at 100° F.

Class B containers are suitable for 40 per cent propane, 60 per cent butane mixture having an approximate vapor pressure at 100° F. of 113 pounds per square inch gauge.

Class C. containers are suitable for commercial propane having an approximate vapor pressure of 195 pounds per square inch gauge at 100° F.

3. Working and Test Pressure for Storage Containers:

(a) Working pressure is defined as the maximum permitted pressure in a container of a given class at 100° F. (see paragraph 2) and shall be as follows:



a VALVE that *holds* Pet. Gas!

Here is the cylinder valve especially developed to hold the most volatile liquefied petroleum gas, under any working pressure and regardless of field conditions.

The RegO Cylinder Valve, engineered by the pioneers in Liquefied Petroleum Gas control equipment, is of the packingless diaphragm type . . . fool-proof, abuse-proof and free from faults. Hundreds of thousands of these valves are in constant daily use by practically all marketers of the wet or dry product.

If your present control equipment is not hundred per cent perfect in every respect, we shall be more than glad to have you put your problems up to us.

WE OFFER, FREE—

Every facility of this great organization is at your disposal . . . including all data on manufacture, distribution and sale of Liquefied Petroleum Gas. Write . . . ask us any questions!

The Bastian-Blessing Company
254 East Ontario St.
Chicago Illinois

Class	*lbs. per sq. in. gauge*
For Class A containers	75
For Class B containers	125
For Class C containers	200

(b) Test Pressures: Each storage container constructed under these rules shall be tested under hydrostatic pressure to not less than 50 lbs. in excess of the permitted working pressure when such pressure does not exceed 100 pounds per square inch, and to not less than 1½ times the permitted working pressure for pressures in excess of 100 pounds per square inch, by completely filling the container with water or other liquid. The container must hold the prescribed pressure for 30 minutes without leakage or distress. The test pressures for storage containers shall be as follows:

Class	*lbs. per sq. in. gauge*
For Class A containers	125
For Class B containers	188
For Class C containers	300

(c) Every such pressure container covered by these rules shall be subjected to a test as described in this section at five-year intervals, and in addition shall be thoroughly examined externally every six months.

4. Capacity of Cylindrical Containers:

No cylindrical storage container shall exceed 30,000 gallons water capacity. Storage containers shall be permanently marked to indicate the water weight capacity.

5. Storage Container Specifications for Above or Below Ground Installations:

Construction: Storage containers should be constructed in accordance with the Unfired Pressure Vessel Code of the American Society of Mechanical Engineers, provided, however, that fusion welded vessels not constructed in accordance with the A.S.M.E. Code, may be installed and operated if it can be proven to the satisfaction of those having jurisdiction in the premises that such vessels are safe to install and operate and provided that such vessels are tested as prescribed by the A.S.M.E. Code. Provided also that fusion welded vessels not constructed in accordance with the Code of the A.S.M.E. may be installed and operated, if such vessels have been inspected and approved by a recognized boiler insurance company.

Note: The latest edition of the Unfired Pressure Vessel Code of the A.S.M.E. was issued in 1930, but suggested changes were offered for criticism by the Boiler Code Committee of the A.S.M.E. in the December 1930 issue of *Mechanical Engineering,* and further suggested changes were offered for criticism in the March 1931 issue of *Mechanical Engineering.*

As a result, it is expected that the 1930 edition of the Unfired Pressure Vessel Code of the A.S.M.E. will, at an early date, be considerably modified and amended, because the Code in its present form is incomplete and inadequate, particularly so in respect to its provisions for the construction of welded pressure vessels, which form of construction is in many cases eminently desirable for vessels used for the storage of Liquefied Petroleum Gases.

6. Location of Storage Containers:

(a) Aboveground containers shall be located not less than 50 feet from the nearest building or line of adjoining property that may be built upon, but may be located within 10 feet of buildings devoted exclusively to gas manufacturing and distribution operations.

(b) Tanks may be buried below ground in accordance with Section 7 (b) provided the capacity of individual tanks shall be restricted to 30,000 gallons water capacity.

7. Installation of Storage Containers:

(a) Aboveground: Tanks installed aboveground shall be placed on firm masonry foundations or saddles. All horizontal tanks shall be placed on saddles, and anchorage shall be made to one saddle only, located as near the center of the container as practicable. Structural steel supports shall not be permitted, unless properly fireproofed.

(b) Belowground:

1. Tanks buried underground shall be so placed that the top of tank is not less than 2 feet below the surface of the ground, and below the level of any piping to which the container may be connected, except that in lieu of the 2-foot cover, tank may be buried under 12 inches of earth and a slab of reinforced concrete or equivalent construction in no case less than 5 inches in thickness and capable of sustaining a load of 250 pounds per square foot; slab shall be set on a firm, well tamped earth foundation, and shall extend at least 1 foot beyond the outline of the container in all directions. It will not be necessary to cover the portion of the container to which manhole and other connections are affixed. When necessary to prevent floating, containers shall be securely anchored or weighted.

When a tank cannot be entirely buried, it shall be covered over with earth to a depth of at least 2 feet with a slope on all sides of not less than 1½ to 1 provided that this shall not be construed as requiring an earth cover over that portion of the tank containing manholes, gauging devices, filling, discharge and other similar connections.

2. Tanks shall be set on a firm foundation and surrounded with soft earth or sand well tamped in place. Where soil conditions are such as to involve the possibility of corrosion they shall be coated with a corrosion resisting paint or other similar coating, and when required by the inspection department having jurisdiction shall be completely enclosed with reinforced concrete, with at least a 6-inch space on sides between tank and concrete filled with sand or well tamped earth, and with 12 inches of sand on top of tank.

8. Dikes and Embankments:

Note: The committee has not come to a definite decision as to the extent to which dikes are necessary. While the following requirement may be eventually modified, it is offered for the guidance of those who may be confronted with this problem.

In locations where, owing to the slope of the ground, aboveground storage containers are liable, in case of rupture or overflow, to endanger adjacent property, each container should be protected by a dike or embankment forming a reservoir of capacity not less than that of the storage container. Dikes or embankments shall be at least 3 feet distant from the storage container. They shall be made of clay core cinder fill, earth, masonry or approved concrete. Earthwork embankments shall be firmly and compactly built of good earth from which stones and vegetable matter have been removed. Embankments shall be continuous with no openings for piping or roadways. Suitable arrangements shall be made for dike drainage. Piping should preferably be laid over or under embankments.

(Continued on Page 53)

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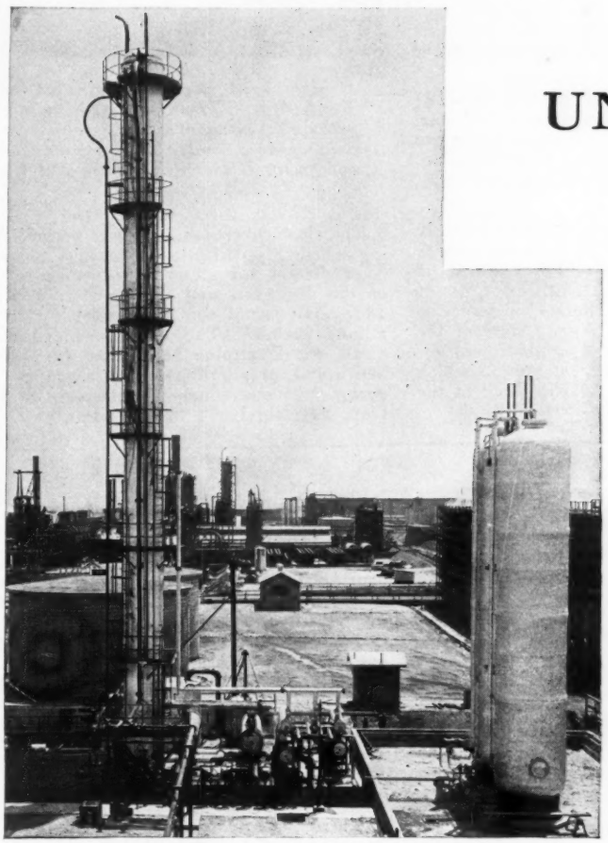
Peak Load
New Plant Operation



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Likewise producers of oil gas are enabled to reduce manufacturing costs by complete replacement with air-mixed liquid gas.

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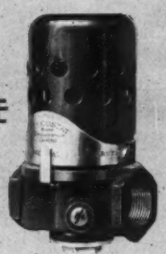

The **WILCOLATOR Co. Newark N.J.**

Group Demonstrations in Neighborhood Stores

SMALL group demonstrations at neighborhood stores are proving an effective method of acquainting housewives with air butane gas service according to the Natural Gas Corporations of California, Oregon and Washington.

These demonstrations are arranged in cooperation with the neighborhood grocer, and modern gas equipment put in place by the gas company.

The practical use of this equipment is demonstrated through the actual preparation of foods used by the average housewife, and she is able to inspect closely the range in operation. This brings the prospective consumer in much closer contact with the demonstrator than is possible through larger group demonstrations.

These lessons are held over a two- or three-day period, and much interest has been taken in every instance. Those attending are awarded the finished cooked food as prizes each day, which helps to stimulate both interest and attendance.

Another profitable demonstration recently held under the direction of the home service department of the Natural Gas Corp. of California was before the Nutrition Class of the Humboldt State Teachers College. The class congregated at the Arcata store of the company and inspected the appliances in detail previous to the demonstration, which was held by Miss Elner Martin, head of the department.

Neighborhood store demonstration at Bend, Ore. These demonstrations are arranged in cooperation with the neighborhood grocer and modern gas equipment is installed by the Natural Gas corporations.

The class covered a two-hour period, during which Miss Martin prepared a complete day's dietary for an average person by use of the gas oven and refrigerator, and the additional use of the gas broiler for a 20-minute period. The menu included three meals, the Electrolux being used for dessert and salad preparations—the gas range for everything else, including cereal, stewed fruit, vegetables and broiled meat.

Propane Bulk Station for Suburban Gas Co.

The Suburban Gas Co. of Belleville, N. J., has recently completed a propane bulk station at Belvidere, New Jersey, which will be a charging base for bottled gas cylinders to be dispensed through that area, and in eastern Pennsylvania.

The company holds a butane franchise at Belvidere, and later expects to pipe the town for this service. The bulk station was constructed under the supervision of Richard Hudson, engineer of the company, and under Philfuel specifications. Mark Anton is president of the Suburban Gas Co.

Sunrise Gas Co. Formed for "Bottled" Gas Distribution

Announcement is made of the organization and incorporation of the Sunrise Gas Co., 116 Main St., Port Jefferson, Long Island, with Robert M. Stevenson as president. In addition to distributing Hopane, the company will engage in the sale of ranges and other types of appliances and equipment used in bottled gas installations. A warehouse and showroom will be maintained at the headquarters address.

Natural Gasoline Assn.'s Research on Liquefied Gas

The Natural Gasoline Association of America is carrying on research work on the subject of liquefied petroleum gas, and has appointed a committee to study the problems connected with its manufacture and distribution. The committee will be chairmaned by G. G. Oberfall, who has announced the appointment of several sub-committees. The committees will study the methods of testing, specifications, transportation and will make a survey of new markets.

Survey of Liquefied Gas Distributing Plants by A.G.A.

The Statistical Department of the American Gas Association has recently completed a survey of liquefied petroleum gas plants in the United States. The survey includes the names of communities served by liquefied petroleum gas plants, population, date of beginning of service, type of gas and heating value, number of customers, name of company operating the plant and its holding company. Copies may be obtained from convention headquarters, 420 Lexington Ave., New York.

Takoma Philgas Appliance Co. Wins Sales Contest

An item in the August issue of *Western Gas* stated that in the recent sales contest conducted by Philfuels Co. in the interest of "bottled" gas, 41 new customers were added to the company's totals. This figure applied to the customers added by the winner in the contest, the Takoma Philgas Appliance Co., Takoma Park, Md.

Householeating Campaign for Natural Gas Corporations

On August 1 the three Natural Gas Corporations, of California, Oregon and Washington, began a house heating campaign which will extend through the fall months till the first part of November. Headquarters for the companies are maintained at San Francisco, Calif.

Merritt Now District Representative

Glenn Merritt has been appointed as district representative for the Natural Gas Corporation of California in the Dunsmuir and Yreka territory.

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OF CALIFORNIA

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A COMMERCIAL *BUTANE* OF EXCEPTIONAL PURITY

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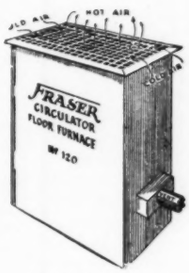

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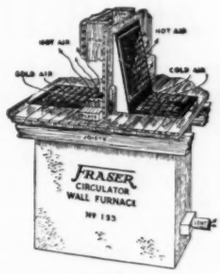

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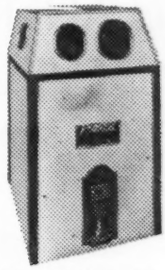

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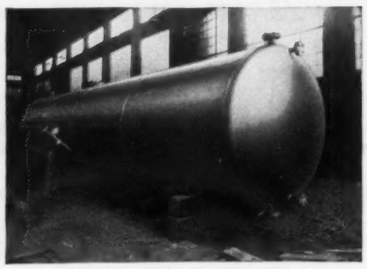

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Detroit Lakes Gas Co. to Serve More Small Towns

Detroit Lakes Gas Co., Detroit Lakes, Minn., subsidiary of Municipalities Gas Corp. of Minneapolis, has been granted gas franchises at Perham, Clark Rapids and Callaway, Minn. Supply for the towns will be 2,550 B.t.u. propane gas delivered by truck from Detroit Lakes. The company is inaugurating a plan for serving all small communities within a radius of 50 miles of Detroit Lakes from the plant in that town. Construction of the Callaway distribution system is under way and work on the systems at Perham and Clark Rapids is to be started immediately.

Surveys are also being made by the company in Hawley and Ulen, Minn., to ascertain the possible load in those two communities. If the survey is favorable, franchising negotiations will probably be entered into.

Two Harbors, Minn., Votes for Municipal Butane Plant

The City of Two Harbors, Minn., has voted to construct and operate a butane plant and distribution system. An election was held on August 12 to decide on municipal ownership of the gas system in the town, and construction work is expected to begin shortly. The plant will cost in the neighborhood of $35,000.

Aitcheson Resigns as Vice-President of Natural Gas Corporations

R. E. Aitcheson, executive vice-president of Natural Gas Corp. of California, Natural Gas Corp. of Oregon and Natural Gas Corp. of Washington, has resigned from these companies, his resignation becoming effective July 31. Mr. Aitcheson is also severing his connections with Standard Management and Operating Corp.

Natural Gas Corp. of Oregon Conducting Survey at The Dalles

Natural Gas Corp. of Oregon, headquartered at Portland, is conducting a survey in The Dalles, Ore., looking toward the establishment of a butane plant and distribution system. If 250 consumers will sign up for service, the company will go ahead with the work.

Northland Utilities Asks Action on Franchise Application

Northland Utilities Co. is asking the city of Fergus Falls, Minn., to take some action on the franchise pending there. The company asked for the privilege of constructing a plant and distribution system for the service of liquefied petroleum gas in the town.

Marshall, Sleepy Eye and Tracy May Get Gas Service

It is reported that R. M. and J. D. Dutcher of Osceola, Neb., are negotiating for franchises for the service of gas in the towns of Marshall, Sleepy Eye and Tracy, Minn. The reports state that some form of liquefied petroleum gas will be served.

Completes Plant at Cloquet

Northland Utilities Co., Hibbing, Minn., announces completion of its plant at Cloquet, Minn., with completion of the distribution system scheduled for September 1.

Formulating Regulations for Storage and Handling Equipment

(Continued from Page 48)

9. Fencing:

Aboveground storage containers and entrances to underground storage containers should preferably be surrounded by rugged steel fencing to protect them from mechanical injury and from tampering by unauthorized persons.

10. Piping:

(a) All piping shall be standard full weight wrought iron or steel for working pressures less than 100 pounds per square inch; for working pressures of 100 pounds per square inch or more extra heavy pipe shall be used.

(b) Joints should preferably be of welded construction. Where fittings are used they shall be capable of withstanding a pressure of at least 125 pounds for pressures less than 100 pounds per square inch. Extra heavy fittings shall be used for pressures exceeding 100 pounds per square inch. Cast iron fittings shall be prohibited.

(c) Piping shall be run as directly as possible, without sags, and traps; provision shall be made for expansion, contraction, jarring and vibration.

(d) Piping outside buildings may be buried or aboveground, but shall be protected against mechanical injury.

(e) Afer installation piping from container to high pressure regulator shall be tested and proved tight at a pressure equal to the test pressure prescribed for the storage container.

11. Filling Pipes and Discharge Pipes:

(a) Filling pipes when installed in the vicinity of any door or other building opening shall be as remote therefrom as possible so as to reduce the liability of the flow of liquid or vapor through building opening. The terminal shall be outside of building. For underground tanks, the filling terminal shall be so designed as to make access difficult by unauthorized persons.

(b) Filling pipes shall enter storage tanks from top and shall not extend below the liquid level in the container.

(c) Filling pipes shall be provided with suitable automatic valves to prevent back flow in case the filling connection is broken.

(d) Discharge pipes shall be provided with suitable automatic shut-off valve to prevent escape of gas in case of break in pipe.

(e) Except at cylinder filling plants, discharge pipes shall enter tank at top.

(f) Filling and discharge lines shall be provided with shut-off valves located as close to the tank as possible.

12. Safety Devices:

(a) Every storage container shall be provided with one or more safety relief valves of spring loaded or equivalent type, arranged to afford free vent to the outer air.

(b) Parts used in adjustment of safety relief valves shall be so arranged that tampering will be minimized.

(c) Safety relief valves shall be set at not to exceed 90 per cent of the test pressure.

(d) Effective discharge area required for safety relief valves shall be determined by the method described in Appendix.

(e) In industrial plants discharge from safety relief valves shall be vertically upward and shall be piped to a point at least 10 feet above the container; but in any event such discharge shall be at least 100 feet distant from any open flame or hot working operations; provided, however, that if the discharge is located 10 feet higher than the roof of any building containing open flames or hot working operations which are located within 30 feet of the storage container it shall be deemed as compliance with this rule.

(f) In town gas plants and charging plants discharge from container safety relief valves shall discharge vertically upward and shall be piped to a point at least 10 feet above the container and discharge from safety relief valves within a building, shall discharge vertically upward and shall be piped to a point above the roof level of building.

(g) Discharge pipes shall be fitted with loose rain caps. Return bends and pipe fittings on the upper end of the safety valve outlet shall not be permitted.

13. Vaporizer and Housing:

(a) The vaporizer shall be located outside of buildings except such buildings which are devoted exclusively to gas manufacturing and distribution operations; but may be located in a house or shed, of fire-resistive construction, well ventilated from points near the floor and roof. Such building shall be so located that it will not be subject to mechanical injury from cranes, locomotives, etc.

(b) If such house or shed is a lean-to or a building addition it shall be separated therefrom by an unpierced fire wall.

(c) Artificial lighting shall be restricted to electricity and shall be installed in strict accordance with Article 32 of the National Electrical Code.

(d) No gas in the liquid phase shall be piped into any building other than those which are devoted exclusively to gas manufacturing and distribution operations. Liquid gas shall be converted into the gaseous phase (vaporized) before entering such buildings.

(e) Gas, from the vaporizer, or from storage tank if it is taken direct from the storage container in the gaseous phase, shall pass through a suitable regulator before entering the meter and/or the mixing device. At or near discharge of vaporizer a safety relief valve shall be provided having an area at least 50 per cent of the cross sectional area of the discharge line from the vaporizer.

(f) The element that supplies the necessary heat for producing the steam, hot water or other heating medium shall be located in a separate compartment or room which shall be separated from compartments or rooms containing gas mixing or proportioning devices, by an unpierced fire wall.

(g) Where a device is employed for premixing or proportioning the gas with air, such device shall be provided with some means for automatically shutting off the gas-mixing or proportioning device before a combustible mixture is generated.

14. Liquid Level Gauging Devices:

Gauging devices shall be of suitable design. Where visible type device with gauge glass is used, the device shall be equipped with valves having ball checks in the body; metallic hand-wheels equipped with knobs or holes or gauge cocks of other than cast iron construction; and high pressure gauge glass. This type of gauge shall be guarded against mechanical injury by suitable protection.

15. Valves and Connections:

(a) Valves and connections shall be of a suitable type, and shall withstand a pressure equal to test pressure of the container without leakage.

(b) Tanks shall be equipped with one or more safety valves of suitable type as prescribed in Section 12.

16. Filling Densities:

(a) The "filling density" is defined as the per cent ratio of the weight of the gas in a container to the weight of water the container will hold. The filling density for storage containers shall not exceed the ratios following:

Specific Gravity at 60° Fahr.	*Maximum Permitted Filling Density*
.500 to .504	45.5%
.505 to .508	46.0%
.509 to .510	46.5%
.511 to .514	47.0%
.515 to .518	47.5%
.519 to .522	48.0%
.523 to .527	48.5%
.528 to .531	49.0%
.532 to .535	49.5%
.536 to .540	50.0%
.541 to .544	50.5%
.545 to .549	51.0%
.550 to .553	51.5%
.554 to .557	52.0%
.558 to .561	52.5%
.562 to .566	53.0%
.567 to .571	53.5%
.572 to .575	54.0%
.576 to .580	54.5%
.581 to .585	55.0%

(b) The liquid portion of the gas in a container shall not completely fill the container at 130° F.

(c) Each storage container shall be permanently marked in increments of 20° F. with the maximum levels to which it can be filled with liquid at temperatures between 20° F. and 130° F.

17. Transfer of Liquid:

Tank cars are unloaded by two methods, namely, pressure differential and pumping.

(a) PRESSURE DIFFERENTIAL:

The pressure differential between the tank car and storage tank may be obtained as follows:

1. Reducing the vapor pressure of the liquid in storage tank to less than the vapor pressure of the liquid in the tank car by cooling the liquid in storage tank. This may be accomplished by passing cold water through the coils in the storage tank, or by using vapor from the storage tank, thus utilizing the latent heat of vaporization to cool the contents which will lower the vapor pressure.

2. By increasing the temperature of the liquid in the tank car over that of the liquid in storage tank by passing steam or hot

water through coils on the tank car, thus increasing the vapor pressure in the tank car. With this method it may be necessary to cool the liquid as it enters the storage tank in order to maintain the differential in the pressure.

3. Using gas or air pressure on the tank car's contents to produce the desired pressure differential.

4. Using gas pump between storage tank and tank car for reducing pressure on storage tank and discharging into tank car.

(b) PUMPING:

The liquid may be pumped from the tank car into the storage tank by properly designed and operated liquid pumps. If electric motor driven, motor shall be of a type for use in hazardous atmospheres, unless the motor is located in separate building with vaporproof stuffing box for line shaft or with adequate outside air spaces between buildings.

18: Painting:

Aboveground storage containers shall be painted a light reflecting color, or be lagged in accordance with the I.C.C. provisions for tank cars.

19. Holders:

Where gas is stored in holders such holders shall be constructed in accordance with recognized good practice.

APPENDIX

Required Sizes of Safety Valves for Stationary Butane and Propane Storage Tanks

Note: D = diameter of tank in feet
U = length of tank in feet

	Required Safety Valve Size
Where (D x U) does not exceed 50	½ in.
Is greater than 50 but not more than 90	¾ in.
Is greater than 90 but not more than 150	1 in.
Is greater than 150 but not more than 250	1¼ in.
Is greater than 250 but not more than 350	1½ in.
Is greater than 350 but not more than 550	2 in.
Is greater than 550	2½ in.

In the above table one safety valve is required in each case. However, where two tanks are installed less than 50 feet apart, two safety valves of the size required above or a single safety valve corresponding to two-times the product (D x U) in the above table must be provided for each tank.

It is further required that all safety valves shall have an actual free area throughout the valve equal to or greater than the internal transverse area of the standard pipe corresponding to the nominal safety valve size.

Basis for Cooperative Trade Relations Recommended by A. G. A.

FOLLOWING investigation and conferences on gas company-dealer relationships, by the American Gas Association's Committee on Allied Trades, a statement of principles recommended by the committee as a basis for cooperative trade relations was recently adopted by the executive board of the A.G.A. and distributed to member companies of the Association. Oscar H. Fogg, vice-president of the Consolidated Gas Co., New York, is chairman of the A.G.A. committee on Allied Trades.

These principles were presented before recent annual conventions of the National Retail Hardware Association and the National Association of Master Plumbers by Hugh Cuthrell, chairman of the American Gas Association Committee on Trade and Dealer Cooperation. At the hardware dealers convention a resolution was adopted advocating cooperation of hardware merchants with gas and electric companies when the utility takes the initiative in requesting dealer cooperation. A resolution was passed by members of the Plumbers Association recommending that the association accept the principles as set forth by the A.G.A. and do all within its power to assist in their adoption by state associations.

Following are the basic principles adopted by the American Gas Association, and recommended to trade associations for promoting cooperative relations:

"It is recommended that gas companies take the initiative in bringing about conferences with dealers in their localities, to the end that the following or other mutually acceptable principles may be agreed upon, adopted and put into use for the purpose of stimulating the sale of suitable gas appliances and promoting the use of gas service in a way that will be mutually advantageous to all participants.

1. All gas appliances offered for sale by all cooperating agencies shall bear the seal of approval of the American Gas Association Testing Laboratory.

2. No appliances or merchandise not directly related to the use of gas shall be sold by gas utilities.

3. In all merchandising activities, the resale mark-up of all gas appliances that have received reasonable customer acceptance shall be consistent with present day merchandising practices. There shall be no premiums given with nor trade-in allowances made in connection with the sale of any such appliances unless all cooperating agencies are in a position to participate.

4. The presenting to the public of those gas appliances not having received reasonable customer acceptance shall be considered as promotional activities and not as merchandising activities.

5. Coordinated advertising of approved appliances should be developed by gas utility companies and local dealers, and the gas company should give all reasonable assistance possible to the dealer in advertising, displays and sales assistance.

6. The deferred payment feature of our merchandising activities shall be on an economically sound basis."

In presenting these principles, Mr. Cuthrell addressed the two associations in part as follows:

"With the development of the use of gas for cooking, the entire burden of promoting the sale of cooking appliances rested upon the gas companies. The manufacturer of gas ranges had no outlet for his goods except through the gas companies, for dealers were not then—nor are they now—in the least interested in undertaking a purely promotional activity as differentiated from a merchandising activity.

"The introduction and commercial establishment of any new article or commodity must be accompanied by extended pioneering and the development work must continue for whatever period of time necessary to bring about general public acceptance of the article. . . . It is obvious that if the effort to popularize and bring about public acceptance of these appliances is left entirely to the dealer, with the stimulus due to the utility's incentive withdrawn, the result must react to the disadvantage of the dealer as well as the utility.

"For in the nature of things there is no escape for the utility from the obligation to create a market for appliances. Whether the requirements of the market, so created, are met by the utility or the dealer is of secondary importance to the utility. The dealer is, of course, interested in merchandising activities from the standpoint of merchandising profit. The utility is interested for a totally different reason—that of extending the use of gas service—and that is the sole incentive underlying the utility's activities. With such entirely different motives animating each group, and yet with the acknowledged desire of each to work harmoniously and for mutual advantage, the problem becomes one of finding a common ground of cooperative endeavor whereby the activities of each interest may be profitably directed.

"I believe the principles of our Association will go far in establishing such a basis.

". . . . Those of you who are familiar with the work of national associations know full well that the movements undertaken by any national association will rise or fall depending upon the support it receives from local sources. And no national movement of the type we are discussing can succeed without the assistance that will come as a result of local meetings held by representatives of local utilities and dealers. At such meetings agreement can be reached as to the appliances still in promotional state, and those of a merchandising character, as this situation varies in different parts of the country."

A similar set of principles was recommended to electric utilities and dealers by the Electrical Merchandising Joint Committee of the National Electric Light Association following a meeting in Atlantic City recently. These principles were sent to executives and commercial managers of about 1,500 member companies.

Service for Butte and Helena by September 7

Montana Power Co.'s line from the Cut Bank field in the northern part of the state of Montana to Butte, Helena, Anaconda and Deer Lodge, late in the month was reported nearing completion, with September 1 set as the date for completion of tests by engineering crews of the company. The main line is of 20-inch pipe, with a 16-inch lateral extending to Butte and a 12¾-inch line to Helena. Service connections are expected to be made in Butte and Helena and Anaconda, by September 7. Cost of the entire project is estimated at $10,000,000.

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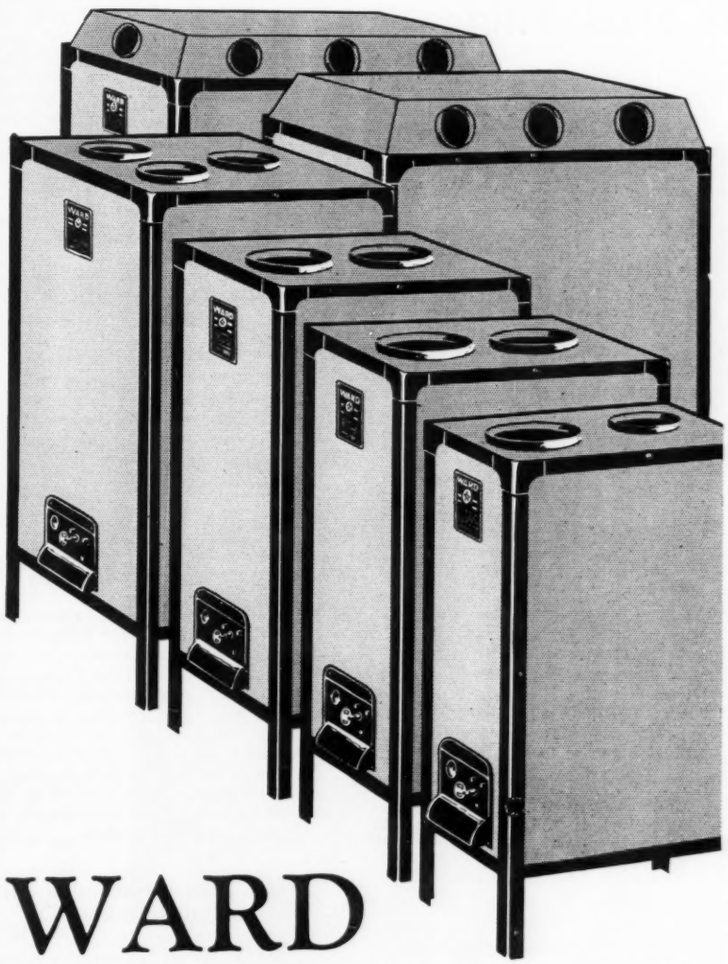

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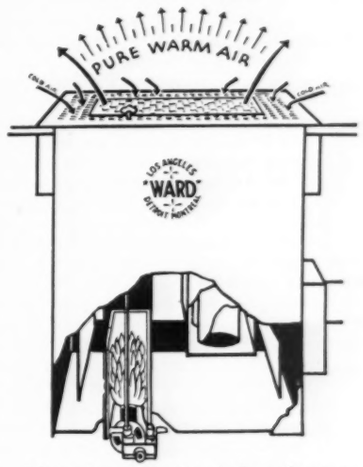
See, also, the Famous Ward Floor Furnace



More than 250,000 of these furnaces are now in use . . . giving satisfactory service in every part of the country. It's the kind of furnace users recommend to their friends. Agency details on request.

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446 East 12th St.
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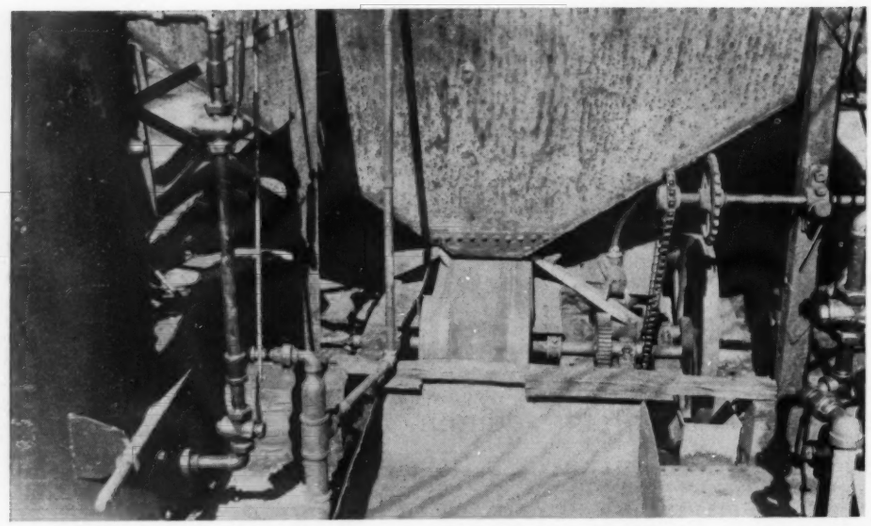


Blasting house hopper, showing conveyor belt.

Blasting Pipe with Steel Filings

(Continued from Page 31)

In cleaning threaded pipe a protector cap is placed over the threaded end and a plug is inserted in the collar end. This is done to prevent the filings from becoming lodged in the threads—a condition which would cause leaks in the joints, as the filings would cut into the threads when the pipe was being screwed together.

As a further precaution against the filings sticking to the threads, each joint after cleaning is blown with clean air both inside and outside.

No protectors are needed on plain end pipe, but each joint is blown out with dry air after it has been cleaned.

When the pipe comes from the blast, each joint is thoroughly inspected and if any spots have been missed the joint is returned to the plant with the next batch.

The clean pipe is wiped and then passed through the priming machine, where the primer coat is applied. The paint is dropped on the pipe as it travels through the machine, and revolving brushes spread the liquid evenly over the surface. As the pipe comes from the priming machine it is placed on a rack adjacent to the wrapping machine and moves along the rails as the joints are removed from the opposite end and fed into the wrapping machine.

This method of cleaning has been practiced for some time, and the results have been entirely satisfactory. In fact, the pipe is more thoroughly cleaned now than with any other process ever employed at this plant.

The surface of the pipe is so clean that it appears to have been painted with aluminum paint. It is free from all oil, grease, rust or mill scale and the surface has been roughened to such an extent as to assure an adequate bond between pipe and coating.

A few statistics will serve to show some of the high spots in the operation of the plant. The bottom part of the cleaning house is built in the form of a hopper running the length of the building. A belt conveyor travels along this hopper and collects the fines as they fall from the hopper. The fines are a combination of steel filings, dirt, mill scale and rust. As they are dumped into a small bin the dust and dirt are entirely blown out by means of a fan.

The steel filings are then returned to the blasting machines and used over again. It is believed that the filings can be used from 100 to 125 times. The cost of the filings is about $100 a ton. One ton will clean from 100 to 125 thousand feet of 1¼-inch or 2-inch pipe.

Two blasting machines are used in the operation, one being filled with filings while the other is in blast. A separate hose enters the blasting house from each machine and the blaster who works inside turns them on or off as desired.

The blasting house holds 52 joints of 1¼-inch pipe or 46 joints of 2-inch pipe, with joints laid side by side.

The average cleaning time for this amount of pipe is 45 minutes, and with steady operation about 10,000 feet of 1¼-inch or 2-inch pipe can be cleaned on an 8-hour shift.

The blasting machines each hold 1500 pounds of filings and will last about 20 minutes. The Blasting Machines are the patent of S. P. Davis, Silsbee, Texas.

The compressed air is furnished by two 7¾ by 12-inch air compressors, each directly connected to a diesel engine. Each compressor has a rated capacity of 212 cubic feet of air per minute. The operating pressure is 110 pounds per square inch.

Seven men are employed in the operation of the machine:

1 compressor man
1 blaster
2 laborers feeding machine
2 laborers receiving cleaned pipe and feeding priming machine
1 man attending blasting machines.

It is felt that this description will give a clear and comprehensive idea of this method of pipe cleaning and will aid materially in solving pipe cleaning problems.

This method has been inspected by many engineers in this locality and the concensus of opinion is that the pipe has been entirely freed of all foreign material and is in excellent condition to receive the protective coating.

A problem in pipe wrapping also had to be solved at this plant. All coatings are only as good as their weakest point, and feeling that the protective coating was being applied in the best known manner, attention was then turned to the protection of the joints in the field when the pipe was being laid.

All mains at this plant are steel pipe with welded joints, so it was necessary to standardize on a method of covering the welded joints. The method now being employed, and which guarantees a protection considered to be equal to the plant-wrapped pipe, is to apply the priming coat to the joint after the pipe has cooled sufficiently from the welding operation so as not to burn the primer but is still warm enough to insure rapid drying. The pipe is strung and welded while the ditch is being dug so there is ample time to complete the whole operation. After the primer has dried, a cold coating is then applied and the joint securely wrapped with an impregnated wrapper to protect the coating from the back filling shock during the process of drying.

As a check on wrapping and pipe, daily reports are made on the condition of both at every point in the system where the main lines are uncovered for service line extensions. These reports are considered to be an excellent check because they cover random points in the system every day. A review of these reports is most satisfactory because very few cases of rust or corrosion have been reported and a large amount of the pipe has been in the ground five years or longer.

It must be realized that pipe protection may be a different problem for each locality; but the preparation of the pipe surface for whatever coating is to be used should be just as thorough in one case as in another, and it is the belief of many who have made a study of this particular phase of pipe coating that unless the pipe is first put in a *receptive* condition no protection will be an absolute guarantee against corrosion. In fact, even now many buyers are placing more rigid specifications in their contracts and some are even specifying blast cleaned pipe.

Acknowledgement is made of the valuable assistance rendered by Will I. Lewis, of McEverlast, Inc., in the development of this efficient cleaning process.

Line to Laramie from Baggs To Get Under Way

C. E. Bivens and associates are going ahead with plans for construction of a 120-mile, 8-inch gas transmission line from the Baggs field in southern Carbon county, Wyo., to Laramie, via Saratoga, Medicine Bow and Rock River. According to reports from the press, the line will be financed by the Utah Construction Co. Drilling operations are under way by the Red Feather Oil Co. and the Producers Oil Co., both of Denver, Colo. The company's test well is said to be producing 25,000,000 c.f. daily.

W. E. Boyd Merchandise Mgr. for Fort Stockton Gas Co.

W. E. Boyd, industrial engineer of Texas Cities Gas Co., El Paso, has assumed the position of manager of the sales and gas appliance department of the Fort Stockton Gas Co., Fort Stockton, Texas. The company is completing a gas transmission line from fields in central Texas. The line is approximately 120 miles long, and is being built of 8-inch pipe.

Save Dollars on Installation

Costs—*This Way!*

You know how your labor costs can mount up and up, when you install the ordinary radiant heater in a fairly tight place. When it's a close fit in a fireplace—it's just too bad.

But with RAY-GLO it's an entirely different story. See these photos!

RAY-GLO, intact, *(top picture)* is placed just to the housewife's satisfaction.

Then TWO screws are removed, the manifold dropped down—and ALL THE REST of the RAY-GLO is set to one side, out of the way. *(Middle picture.)*

No need for a contortionist now! Simply connect up the manifold — right out in the clear, with nothing to bother. Then a test for any possible leak — the RAY-GLO goes back into place, the two screws tightened . . and the job's DONE! *(Lower picture.)*

No "ADJUSTMENT" to make — thanks to RAY-GLO fixed mix. **(Still another saving.)**

No "SERVICE CALLS" — you install a RAY-GLO, and then you can forget it!

Write or wire for full details on these remarkable money-making radiant heaters — in a class of their own!

NEW low prices now open up an entirely new field for RAY-GLO sales—and we cooperate in a surprising way. Ask us!

RAY-GLO CORPORATION, *Athens, Ohio*

Gas and Electric Ranges—a Comparison

(Continued from Page 30)

modern ranges as standard equipment, which greatly adds to convenience of oven and eliminates guess work.

Broiling in a gas range is very efficient, since the intense heat can be applied rapidly —searing the juice in and retaining the full flavor of the meat. The smoke incidental to broiling is carried off through the flue, instead of being driven out into the kitchen. The gas range is the only range having this feature.

Fundamental requirements of a modern range may be summed up in the following sub-headings and a direct comparison made between gas and electric:

Beauty: Both gas and electric ranges may be had in a variety of colors and designs, and as far as appearance is concerned can be considered on an equal basis.

Convenience: The ease with which vessels can be moved, along with the larger cooking surface on the gas range, places the latter above the electric range in convenience.

Cleanliness: Taking everything into consideration, the gas range is the cleanest cooking device possible, inasmuch as all cooking vapors from the oven are vented directly into the chimney and therefore to the outside of the house. This of course, does not hold with most electric ranges, since through the lack of circulation in most installations the cooking vapors remain in the oven or escape into the kitchen. The cooking top of the modern gas range is probably easier to keep clean, as there are no wires to clog and the whole top may be wiped off at once. Therefore, there is a balance in favor of the gas range.

Utility: The intense heat of the gas burner is superior for rapid frying. In boiling operations several vessels can be grouped over a gas burner and after coming to a boil can be pushed back to take advantage of the different heat zones. The grouping idea can only be accomplished on an electric range by using the so called clover leaf utensils which are limited in size.

Baking: In using the gas oven for baking the greatest advantage lies in the circulating principle which is peculiar to the gas range, preventing the accumulation of stale cooking vapors. Both gas and electric ranges are equipped with temperature control and clock if desired.

Broiling: Broiling requires a rapid and intense heat, and gas is ideal in this respect. Electric ranges lack that quick, intense heat which is necessary for perfect broiling.

Comparative Cost of Operation: The average cost of upkeep on a modern gas range is small, seldom requiring a replacement of parts. About the only expense is an occasional cleaning and adjustment.

The electric range is equipped with snap type switches which often require replacements due to burnt points caused by arcing. Another expense which must be taken into consideration is the life of electric elements. This is more or less problematical, but like electric globes they will eventually deteriorate and burn out. Repair costs range from $1.75 for rethreading an open element to $7.50 for replacing the so-called closed elements.

Quoting from the London, England, Gas Journal, from a lecture given before the Joint Gas Conference at Birmingham, England, February 19, 1930, Professor A. H. Barton, B.A.B.S.C., gives a comparison (Table No. 1) for two identical dinners prepared for five persons, from cold start. The dinner comprised the following items: celery soup, two and one-half pints; fried sole, one pound; roast chicken, two pounds; trussed potatoes, one and one-half pounds; bread sauce, one-half pint; gravy, one-half pint; rhubarb fool and creamed custard.

Taking the total B.t.u.'s in Table No. 1, the 21500 B.t.u's would equal 3.77 cu. ft. of gas at Portland Gas & Coke Co's rate of 570 B.t.u.'s per cu. ft. Therefore, comparing the two totals at $1.09½ per M. cu. ft. of gas and an average of $.02 per K.W.H. for electricity—the cost of preparing the meal would be 4.1c for gas and 10.16c for electric, or almost two and one-half times as expensive for electricity as for gas.

The above shows even more favorable comparison than the test made by the American Gas Association Testing Laboratory in Bulletin No. 3, September 26, 1928, where the conclusion after exhaustive tests showed that electricity for cooking was approximately two times more expensive than gas under prevailing rates.

Range manufacturers claim that 80 per cent of all cooking is done on the top of the range; therefore the comparison of top burners of the gas and electric ranges given in table No. 2 will be particularly valuable.

Conclusions from the tests covered by this table were:

1. Efficiency obtainable with the electric units may vary appreciably with the size of the cooking utensils, even though the variations in size cover only those commonly in use.

2. Apparently the efficiency of the electric heating units is likely to decrease with use, while the unit is still serviceable. The test results show an increase of about 7 per cent in the amount of energy required for the heating stage of cooking by boiling.

3. Small variations in the size of cooking utensils have little effect on the efficiency of gas burners.

From these figures the conclusion is drawn that the ratio of energy used for top burner cooking on gas ranges is 1.35.

In conclusion, from the above figures with gas at 1.095 per M and electricity at 2c per K.W. Hr., a conservative comparison shows that electricity costs two times as much as gas for cooking purposes.

Speed and Cost Tests

Another test reveals interesting data on speed and costs:

From actual tests made on an electric range it was found that in order to bring a quart of water from tap temperature to a boiling point, using a 1500-watt colored speed unit, required 14 minutes. Basing cost on a rate of 1.8c per kilowatt hour this test cost 5.15 mills. Using a 2000-watt open unit it required 12 minutes at a cost of 7.2 mills. These costs are based on the lowest electric rates available in the city of Portland; before a consumer is entitled to such a rate he must use at least $2.85 worth of electricity at an average rate of slightly over .04 per K.W. If the connected load is over 600 watts the amount of electricity charged for this higher rate is increased accordingly.

Using a gas range with a burner passing 24 ft. of gas per hour, the same test was made with the same cooking vessel. It required 6 minutes at a cost of 2.6 mills.

The maximum heat input of the 16-inch oven of this electric range is 10,236 B.t.u. per hour. The input of a 16-inch gas oven is about 20,000 which insures a more constant temperature.

Food, in an electric range oven is cooked in a dead air saturated with the foods own vapors, while in a gas range there is a circulation of fresh air around the food, giving it a better flavor. Because of the fresh air circulation it is possible to cook foods such as cabbage or onions, which have a disagreeable odor, and fumes are all carried out through the vent and out of the kitchen.

Much is made of the efficiency of the electric range, but because of its lack of perfect control, this efficiency cannot be accomplished in actual use. For example—in cooking, a vessel which would require 1800 B.t.u. on a unit of 1000 watts calls for the use of the high speed or 3412 B.t.u., inasmuch as this unit at medium speed gives only 1706

(Continued on Page 64)

TABLE NO. 1

	Fuel Used Hotplate	Fuel Used Oven	B.t.u. in Hotplate	B.t.u. in Oven	Total Fuel	Total B.t.u.	Cost Pence	%
Gas	31 cu. ft.	12 cu. ft.	15,500	6000	43cf	21500	2.15	100
Electric	3.85 unit*	1.23 unit	13.100	4200	5.08u	17300	5.08	2.37

* = 1 K.W.H.

TABLE NO. 2. ENERGY REQUIRED TO MAINTAIN BOILING ON TOP UNITS

Range	Type of Unit	Rating	Required to maintain boiling one hour 8-inch pan K.W. Hr.	8-inch pan B.t.u.	6-inch pan K.W. Hr.	6-inch pan B.t.u.
		Large Units—New				
1	open	1800 W	570	1945	617	2105
2	open	1600 W	436	1487	416	1420
3	solid	1700 W	428	1460	453	1545
4	gas	12000 B.t.u.	...	2080	...	1810
		Small Units—New				
1	open	850 W	209	713	210	717
2	open	900 W	234	799	220	751
3	open	950 W	290	990	263	898
4	gas	9000 B.t.u.	...	1820	...	1980
		Large Units—Old				
1	open	1800 W	625	2132	615	2100
		Small Units—Old				
1	open	850 W	228	778	244	833

New Lines then what?

IT IS THE APPLIANCES THROUGH WHICH GAS IS SOLD THAT MAKES NEW GAS LINES PROFITABLE . . .

Consider the possibilities of the Humphrey Radiantfire in developing new profitable business.

1st. It is an ideal load builder because of its permanent connection and year around demand upon the gas plant.

2nd. It positively secures new business that requires no increase in capital investment.

3rd. Its maintenance cost is at the minimum because of the quality of workmanship and material used throughout the unit.

4th. It is a builder of good will because of the customer satisfaction created by its efficiency and economy of operation.

5th. Its sales expense is low as compared with other gas appliances.

The HUMPHREY Radiantfire

There is a Humphrey Radiantfire for every purpose—authentic period models for fireplace installations and portable vented models that are really vented for any room.

General Gas Light Company
Kalamazoo, Michigan

C. B. Babcock, Pacific Coast Manager
135 Bluxome Street San Francisco

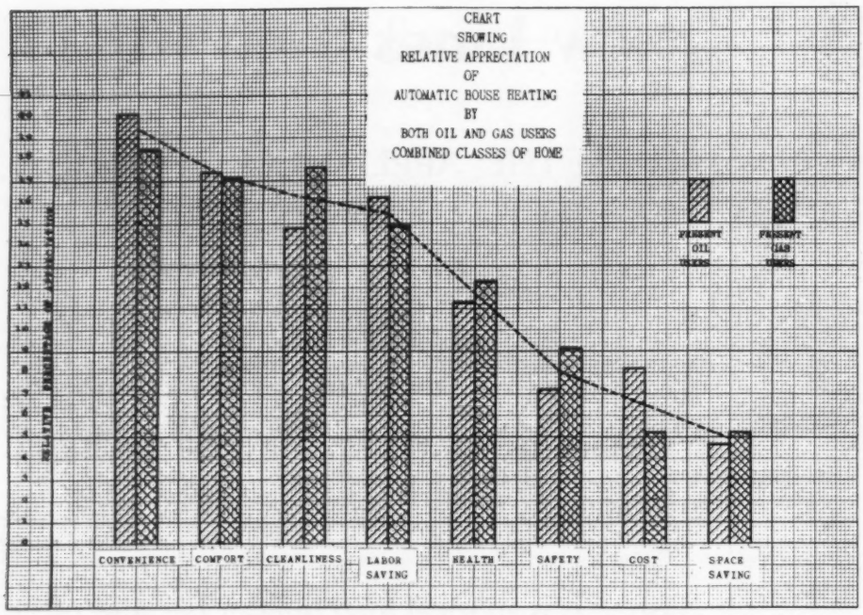


Fig. 2.

Market Facts for House Heating Sales

(Continued from Page 37)

matic heating. It was felt desirable to contact these users to determine the relative power of appeal of different factors involved in the sale of automatic heating. This information, we felt, would prove valuable in building up an improved sales story, an improvement in educational literature, and in advertising material.

These homes, therefore, were contacted with the viewpoint of determining why people purchased automatic heating. In addition to the general information on homes, fuels, etc., comparable to that secured from present coal users, we secured the following type of information:

First, the relative importance of the following appeals, in their original decision to purchase automatic home heating:

Convenience	Health
Comfort	Safety
Cleanliness	Cost
Labor Saving	Space Saving

Second, the relative importance of these same factors after the users had actually experienced the value of automatic home heating in their own homes.

The returns from both present coal users and present automatic heat users were classified into our original home price classes, so that a collective average could be obtained for each class of home.

The condensed, collective results of this work projected over the entire local market are given in table No. 1.

The reactions are from 13 per cent of the owned homes, which should prove very representative to the mass thinking of each class. Th U. S. Department of Commerce states that when divided into price classes, a reaction of only 5 per cent will reflect this mass thought.

Using these allowable convenience values, plus present coal costs, we were thus able to establish definite overall allowed costs for automatic heating for the different homes.

Using estimated average gas consumption for each class of homes, we were, in turn, able to definitely establish numbers of homes, and classes of homes, which would be available under definite gas rate conditions.

This material, however, needed further correction for practical use. It was recognized that many might have a great appreciation of what automatic heating would do for them, but limitations of income would prevent the purchase and enjoyment of these conveniences. Therefore, our set up was corrected for the "ability and likelihood to purchased a recognized value."

A still further correction was made for "saturation." Due to unforeseen conditions all of any class of prospects cannot be sold. Therefore, the net potential at each established rate step, was corrected for this factor.

Fig. 1 shows the results of this work for the particular city concerned, and indicates the potential home heating load available at varying rates.

Reactions of Present Users of Automatic Heat

In the analysis of those present users of automatic heat to determine the relative power of different appeals, we covered several hundred oil and gas users. Fig. 2 summarizes these results, and indicates the relative importance attached to each factor by those who have actually experienced the advantage of automatic heat.

Certainly, advantage should be taken of this type of information in designing sales talks, educational work, advertising literature, etc.

In the sale of any article, all possible appeals should be determined and then the power of each appeal tested, to prevent misdirected and ineffective sales talks, advertising, etc.

We have seen pages of house heating advertising featuring space saving, when it is evident that there are stronger appeals to the average home.

Select those more powerful appeals and dramatize them into visual realizations. For instance, labor saving is time to rest, to play, to stay young, to widen the circle of pleasant social contacts, etc.

In this particular analysis, we have determined the relative importance of those fac-

TABLE NO. 1—REACTIONS OF PRESENT COAL USERS

Average Convenience Value Allowed, above straight fuel cost per heating season week.	Per Cent of Total Homes of this class, represented in replies.	Per Cent of total homes in territory.
Expensive Type of Homes:		
$ .81	22.7%	1.3%
1.86	22.7%	1.3%
3.50	31.8%	1.9%
4.59	9.1%	.5%
5.81	4.5%	.2%
8.05	4.6%	.3%
9.87	4.6%	.3%
Total	100.0%	5.8%
Medium Priced Homes:		
$ .00	5.2%	.9%
.59	10.4%	1.9%
1.52	17.2%	3.2%
2.52	25.8%	4.7%
3.61	17.3%	3.2%
4.49	8.6%	1.6%
5.50	15.5%	2.8%
Total	100.0%	18.3%
Lower Priced Homes:		
$ .00	3.7%	2.8%
.16	16.1%	12.2%
.53	14 8%	11.2%
.85	19.7%	15.0%
1.12	21.0%	16.0%
1.43	8.6%	6.5%
1.74	11.1%	8.4%
2.11	5.0%	3.8%
Total	100.0%	75.9%

AN OPEN LETTER TO THE GAS INDUSTRY

The announcement of July 22nd, 1931, that the American Gas Products Corporation had become a division of American Radiator Company, will not change the sales policy or sales personnel of the Company.

As a division of American Radiator Company, we will have greater resources for development, research and manufacture with which to better serve the interests of the gas industry.

President

AMERICAN GAS PRODUCTS CORPORATION

tors which actually caused several hundred prospects to purchase, and in turn enjoy, the advantages of automatic heating.

It should be true, that appeals to future customers, given the same relative importance, should prove effective. The similarity of mass thinking and behavior could be depended upon to cause the average potential customer to react favorably to appeals proportioned according to the reactions of his own kind.

Needless to say, the success and significance of this program, depends entirely upon the technique used in securing the information, and proper interpretation placed upon the material after it has been secured.

If accomplished correctly, it not only will give an accurate picture of your local market and conditions surrounding it, but will have a tremendous educational value by allowing the potential consumer to logically reason out, and justify to himself, the increased cost of automatic heating.

Later, when they are again contacted, they will be thinking with—not against—your line of reasoning and viewpoint.

On the other hand, knowing the mass thought and reaction of each class of home, in your territory, you can accurately design your sales effort to minimize sales resistance, and to crystalize and further coordinate the viewpoints of seller and potential purchaser.

The essential soundness of this type of survey as a basis for a house heating sales program is amply demonstrated by the importance placed upon similar studies by all large and successful merchandizers, and their willingness to budget time and money to secure first hand information, such as this, on the reactions of the people to whom they must sell.

Natural Gas Now at Chicago's Door

(Continued from Page 26)

angle with the horizontal. A specially constructed barge with a sloping ramp to hold an 80-foot length of 12-inch pipe was floated into position. A second barge, equipped with a derrick, lowered the 80-foot lengths to the sloping ramp of the first barge, where it was joined to the pipe being held in place by the winch on shore.

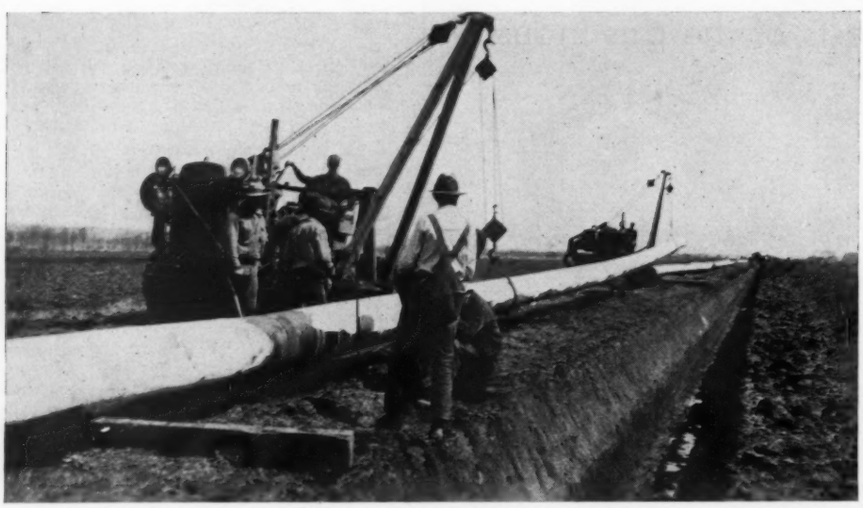
A gas weld, reinforced by steel straps, was made at the joint. Four river weights, weighing 1,500 pounds each, were clamped on each 80-foot length and bolted securely in place. A special protective coating of paint, in addition to the usual covering, was applied to the pipe, weld, and river clamps. Finally, when all operations on the pipe were performed, the barge supporting it was towed slowly out into the river by a tug, the shore winch was released, and the pipe was allowed to sink to the river bed.

The barge was stopped when the pipe had reached a point near the bottom of the ramp. The second barge swung another length of pipe onto the incline, and the welding and application of river weights was repeated.

It took about six days to cross the river (nearly a mile wide at this point) by the method described. Laying the last length of pipe across the river was accomplished at each of the six crossings by lifting the pipe off the incline and lowering it to within a few inches of the water's surface. The pipe on shore was lined up by means of a winch with the pipe over the river, and the pipe was cut to length and welded.

Another interesting crossing was made under the Rock River near Rockdale, Illinois. An 8-foot tunnel was blasted through solid rock for 1,300 feet under the river bed. This was an exception to the general practice, however; most of the river crossings were made directly on the bed of the river.

The source of supply for the pipe line is 300,000 acres of "sweet" gas land (containing no sulphur) in the Panhandle region north of Borger, Texas, which it is estimated will take care of the Chicago markets for at least a generation to come. The field is owned by the Natural Gas Corporation of America. In addition, output from surrounding natural gas area is available under contract if needed.



Laying pipe in Iowa near the Mississippi River on the route of the Continental Construction Corp.'s line from Texas to Chicago. Note sloping walls of the shallow ditch dug in this fashion to prevent cave-ins.

The gas flows through a system of gathering lines to the first compressor station, near Fritch, Texas. This station, now nearly completed, is the largest compressor station on the line, using a total horsepower of 10,000 to send the gas 100 miles along the line to the second station. It is possible that this first station will not be put into immediate use, because the rock pressure of the gas is estimated to be sufficient to send it to the second station, at least until the line begins operating at greater capacity.

Station No. 2 is in Oklahoma, a few miles north of Perryton, Texas, and the remaining eight stations are dotted at 100-mile intervals along the line: at Bucklin, Kansas; Great Bend, Kansas; Glasco, Kansas; Beatrice, Nebraska; Plattsmouth, Nebraska; Chariton, Iowa; Oskaloosa, Iowa; and Cambridge, Illinois. The stations are of course a few miles away from the towns named in each case.

A total of nearly 100,000 horsepower will be used at these stations, when the line is operating at full capacity. It is calculated that the gas will lose one-third of its pressure by friction in its 100-mile journey from station to station, and the compressors, which are gas-driven, are designed to operate at this compressing ratio.

The main pipe line ends near Joliet, Ill. There two 24-inch lines will take its load for marketing and distribution in the Chicago district, which embraces the City of Chicago and the surrounding industrial and residential suburbs. The marketing companies directly concerned are The Peoples Gas Light and Coke Company, the Public Service Company of Northern Illinois and the Western United Gas & Electric Company. Some gas will also be taken from the main line before it reaches Joliet.

The project is seen as a certain stimulation to the use of gas for many purposes that have been closed to it. House heating is one anticipated outlet. More industries will find use of gas economical. To balance the winter load of house heating. there will be extensive development of off-peak service to office and apartment buildings, hotels and other lines of business.

In Chicago

In the City of Chicago itself, The Peoples Gas Light and Coke Company will mix the natural gas with its present manufactured gas, to make a product with a heating value of 800 B.t.u. per cubic foot, instead of 530 B.t.u. as at present. Introduction of the new gas necessitates the readjustment of the city's 9,000,000 individual gas burners. This work is practically completed. The Peoples Gas Company has also practically completed a new mixing and compressor station, erected at a cost of about $1,000,000.

It is expected that the new gas can be turned into the mains some time this fall.

Lewistown, Mont., In Line for Service from Armells Field

Laying of the gas distribution system in Lewistown, Mont., was expected to begin during the middle of August, with completion scheduled for 60 days later, according to a statement credited to C. O. Moore, head of the company which took over the interests of the Lewistown Natural Gas Co. A 6-inch pipe line is being constructed from the Armells structure to the town.

Gas for Denton, Coffee Creek, Stanford and other towns in which franchises are held by the Moore interests will be furnished from the Coffee Creek and Pownell structures, according to recent report.

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NEMEC BURNERS are offered in the largest variety of types of any make in the world.

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NEMEC BURNERS are simple in construction, easy to install and operate.

NEMEC BURNERS include "Bunsens" Multiple-Jets, vertical type, swing type, and combination oil and gas burners.

NEMEC BURNERS, radiant type, are used for converting domestic furnaces and heating boilers.

NEMEC BURNERS are equipped with automatic draft control.

NEMEC BURNERS have exclusive features based on sound engineering principles.

NEMEC BURNERS are proven before offered to the trade. They are the result of 15 years experience with natural gas combustion.

NEMEC COMBUSTION EQUIPMENT includes only specialties of proven merit.

NEMEC ENGINEERS are constantly engaged in research work in a practical way. They understand coal, oil and other fuels and have helped many gas companies to successfully compete against these fuels.

NEMEC BURNERS are standard equipment with some of the world's largest corporations.

NEMEC *combustion* ENGINEERS

WHITTIER — CALIFORNIA.

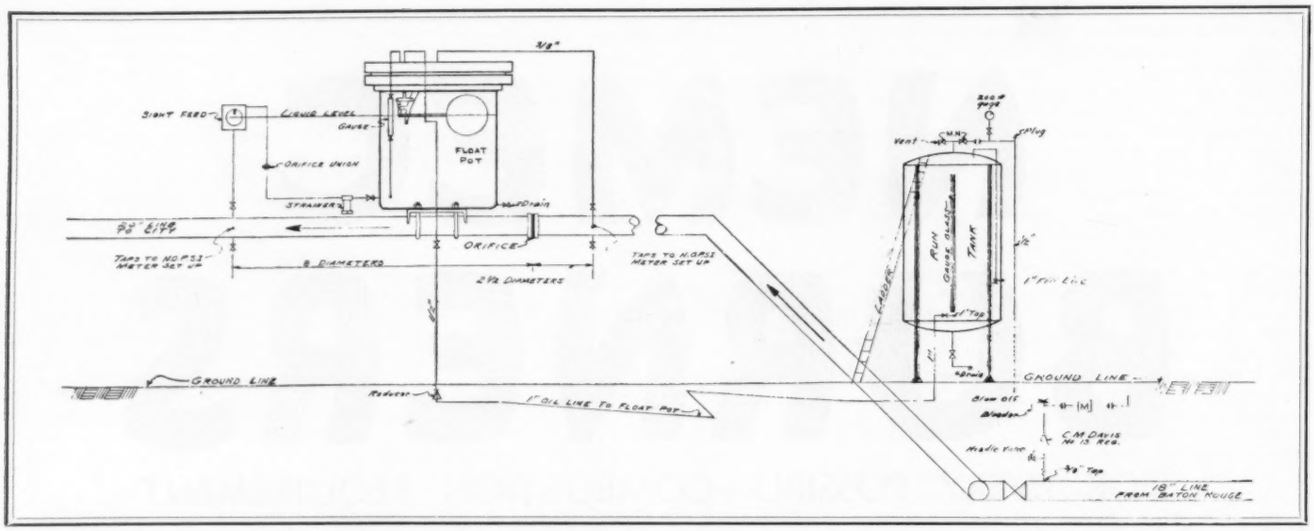


Fig. 3.

Odorizing "Natural" as Practised in New Orleans

used. Instead, another orifice of the same size was installed about 25 feet downstream from the meter setup. This was done in order to eliminate any possible effects which injection of odorant into the downstream orifice tap would have on correct measurement of gas at this point. It will also be noted that a calibration chamber or tube is not used. Very little success has been experienced with the tube for calibrating the oil orifice due to fluctuating gas flow and changes in static pressure. However, the run tank is accurately calibrated in gallons per one hundredth of a vertical foot. By comparing the quantity of gas passed with the number of gallons admitted to the float pot from the run tank, and knowing the square root of the differential pressure across the gas orifice it is possible to approximately

(Continued from Page 25)

determine the size of the orifice in the odorant line required to deliver the desired number of gallons of oil per MMCF.

The odorization setup at the city gate station, Figure 3, is practically a duplicate of the gas plant system. At this station a 1000-gallon run tank acts as storage and the odorant is force fed from this tank to the float pot by a constant gas pressure slightly higher than line pressure.

Initial investment of three stations has totaled approximately $6900, and operating cost data based on an injection figure of 3.5 gallons of odorant per MMCF, indicate that natural gas can be odorized at a cost slightly greater than one-tenth cent per MCF. The cost is relatively small and is offset by the protection against leakage which is afforded the consumer. It might be mentioned that the reaction of the New Orleans public to the odorization program has been favorable, and that local publicity has contributed to its success.

Conclusions

1. Odorization of natural gas with Calodorant No. 3 has proved successful, as a continuous, inexpensive operation.

2. Use of the odorant has facilitated the detection of leaks on the consumers' premises.

3. The use of Calodorant No. 3 has aided materially in locating underground leaks in mains and service lines.

Changes Announced in Puget Sound P. & L. Directorate

According to word received from S. P. McFadden, vice-president of the Puget Sound Power & Light Co., Seattle, Wash., several changes have been made in the directorate of the company.

A. W. Leonard, chairman of the board, has resigned, and the resignations of C. B. Barnes and B. F. Pope have also been announced. New directors elected are W. H. McGrath, executive vice-president of the company; F. W. Brownell, treasurer, and F. E. Holman, counsel. No chairman of the board has been elected.

Barber Co. Issues Catalog on Gas Burners for Boilers

Barber Gas Burner Co., Cleveland, Ohio, has brought from the press a supplement catalog No. 31, describing manual and automatic burners for oblong and rectangular steam, hot water and vapor house heating boilers. The bulletin is attractively made up in two colors with illustrations, charts and specifications, and is designed to meet the needs of heating engineers and contractors. Copies may be obtained by addressing the company at 3702-3704 Superior Ave., Cleveland, Ohio.

To Develop Carbon Dioxide Resources in Washington

Development of carbon dioxide resources in the state of Washington will be carried on by a syndicate headed by R. B. Newbern, president of the Northwestern Natural Gas Co., headquartered at Seattle. The syndicate has taken over the interests of the Klickitat Mineral Springs Co., which owned four wells producing carbon dioxide gas. Mr. Newbern is reported to be planning the expenditure of $100,000 in equipment for the production and manufacture of "dry" ice.

Ernest Fox Now Statistician For Laclede Gas Light Co.

Ernest Fox has joined the Laclede Gas Light Co., St. Louis, Mo., as statistician and assistant to R. J. Vandagriff, sales manager. Mr. Fox was formerly assistant manager and secretary of the Wisconsin Theater, Milwaukee, Wis.

Southern California Gas Co. Sells North Long Beach System

Southern California Gas Co., Los Angeles, has applied to the California Railroad Commission for authority to sell to the City of Long Beach its distribution system in North Long Beach for the sum of $300,000. The city has owned the Long Beach distribution system for several years, supplying the town from municipally owned gas wells in fields near the town. The city plans to take over the North Long Beach system on September 15.

Gas and Electric Ranges

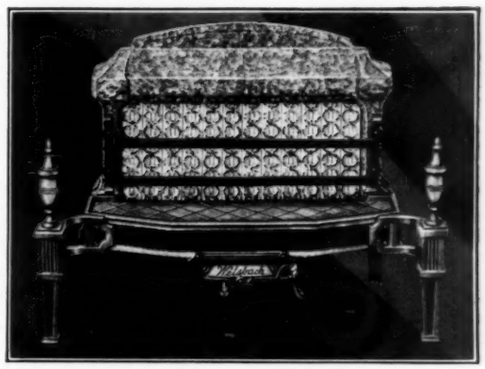
(Continued from Page 58)

B.t.u. and consequently is not sufficient. Gas provides all speeds with any burner.

Most electric ranges are made with one large unit with a diameter of about 9 or 10 inches for frying. Many have the so-called economy cooker unit. It has a vessel which holds 6 quarts and because of its great size is seldom used. This leaves only two medium sized units and the larger frying unit for top cooking, making it possible to cook only three things, and then by using a very large vessel with a base of 9 or 10 inches or by losing a portion of the heat generated.

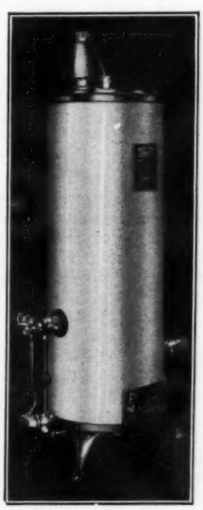
The sum of $1.00 will buy 189,000 B.t.u. at the lowest residential electric rate or will buy 364,000 B.t.u. at the highest residential gas rate. The monthly cost of cooking with gas is therefore about one-half of the cost of cooking with electricity.

Time proved value is of Key Importance in these days of Careful Buying



THESE are days of careful buying. Close scrutiny of value is the rule . . . And the name Welsbach, backed by 40 years of earned leadership in the gas appliance field, is recognized by Commercial Managers more fully than ever before as a definite factor in making sales...**Welsbach Radiant Heaters** are outstanding because of their original design and fine finish—yet are moderately priced . . . Welsbach quality is revealed in every detail of their construction.

Welsbach Water Heaters have gained their leadership through their efficient performance (and favorable prices). In fact there is not a single detail of any Welsbach appliance that will not bear close examination by today's buyers. When Welsbach gas appliances are featured, profitable sales are sure to result.



Member of American Gas Association

WELSBACH COMPANY

GLOUCESTER CITY, N. J.

Offices in Principal Cities

50 Hawthorne Street, San Francisco
226 South Wabash Avenue, Chicago, Ill.

New Minneapolis-Honeywell Control Announced

The new proportioning electric motor control recently placed on the market by Minneapolis-Honeywell Regulator Co.

INTRODUCTION of a control system designed along different principles from existing systems is announced by the Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Fundamentally, the apparatus incorporates a combination of two parts, namely the electrical transmission system and the associated power unit which can be adjacent to or remote from the controlling instrument. A mechanical interconnection is required between the power unit and the electrical balancing mechanism. The transmission system operates on the Wheatstone Bridge principle.

The power unit, inherently a motor driven speed reducer, causes its drive shaft to take a new position whenever the conditions under control, such as temperature, change slightly. If a device such as a valve, or valves, louvers or rheostats are driven by the motor, then their operation tends to correct the change and a condition of equilibrium is approached. The result is that a constant control of temperature, pressure, humidity, liquid level, rate of flow, etc., can be attained.

The apparatus may be used in conjunction with practically all types of control instruments such as room thermostats, temperature controllers of the expansion type, pressure controllers, pyrometers, certain types of flow meters, etc.

The apparatus may be produced in almost any size, from the Minneapolis-Honeywell compact totally enclosed integral combination of small motors and associated receiver mechanisms to more powerful motors which are capable of operating heavy loads. In the latter instance the motor with its gear reducer and all, except the balancing potentiometer of the transmission system is mounted separately.

A notable feature is that the motor operates only when a change of position is demanded by the controller. Then the driven devices are moved immediately to a new position and remain there until conditions again change. This means that the demand for electrical energy occurs only during the repositioning period whereupon the motor starts in either direction with maximum torque available to move the driven device to a new position.

The Position of the Holding Company

(Continued from Page 28)

nomics, generates and produces or otherwise has for sale gas and electric service, patents, apparatus or devices, to its subsidiary companies as well as financing them; and third, where the holding company has brought together smaller companies so as to give them financial strength at lower reasonable rates of interest and for the rendering of more efficient service.

These various classes of holding companies may in turn absorb properties located in remote and scattered communities for which, in addition to the essential financial support, they may render a management service not obtainable by the little companies; or they may group together utilities in a particular section of the country such as has been done in the case of the Middle West Utilities, the Insull interests, most notable of whose properties are those in and around the metropolitan area of the city of Chicago; or they may accumulate or consolidate companies, giving the same service in contiguous territory such as is the case in the New York Consolidated Gas Co., which does not cover a large area so far as geography is concerned, but, of course, covers a tremendous population; or they may accumulate properties covering large rural territory as well as urban areas, all contiguous, and thus produce a diversity of use and a more economic distribution of central production or generation, or of a natural resource, such as in the case of the Pacific Lighting Corporation.

Some of these holding companies which have acquired widely scattered properties have been criticized by saying that their holdings "look like a crazy quilt of the United States rather than a well designed system as might be set up by an intelligent board of engineers acting in the public interest." While it is my opinion that better service can be rendered at lower rates and greater and more economical use of natural resources can be made with greater efficiency of operations where the holding company has brought together utilities within contiguous territory having diversified domestic and industrial uses, such as is the case in Southern California, it cannot be denied that the great financial benefit to both the consumer and the investor, which has accrued under the direction of the older, larger and better established holding companies—even though they may have reached out and included cities and communities in more remote locations of the United States, could not have taken place in these communities if they had not been absorbed into these holding companies.

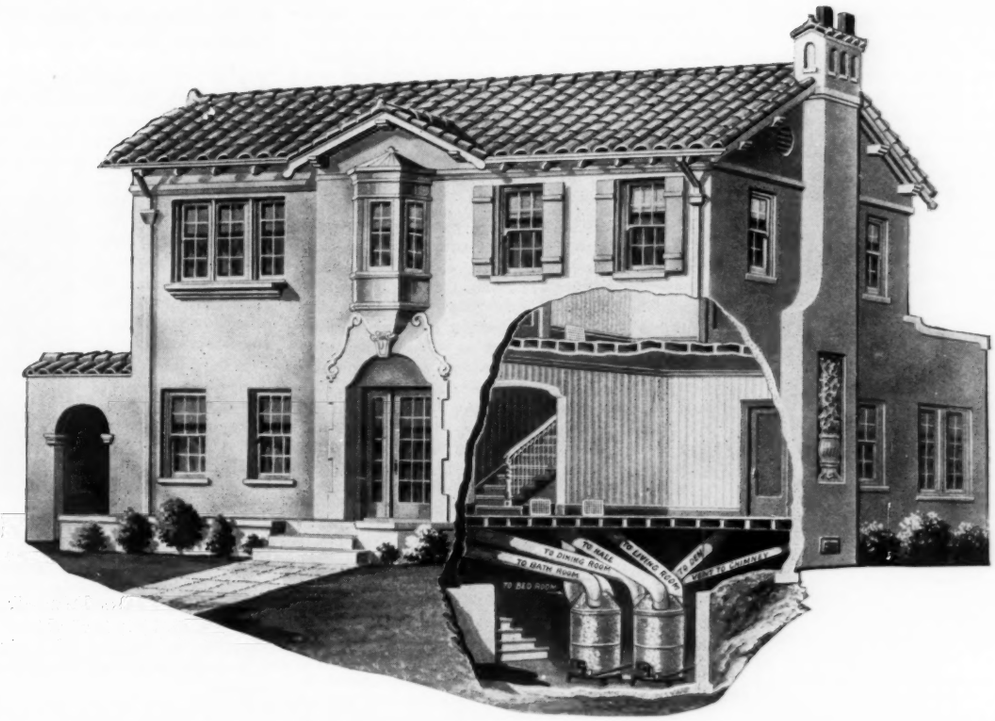
The cases of failure even among the newer companies have been few, but nevertheless, are regrettable. It is characteristic of human nature and more particularly of those individuals who are always dealing in condemnation rather than in constructive thinking, and who always seem to have such marvelous foresight because they are dealing entirely in hindsight, that we hear more of these few instances of failure than we do of the many beneficient successes.

The public utility industry has the same hindsight as its critics and since the industry itself finds some of the conditions which, while they were the natural result of its tremendous and rapid growth, are now open to criticism, it is itself correcting them. This is neither new nor unusual in the history of individuals, business or governments. In any event, the consumers are receiving good dependable service at rates which apparently are not only reasonable for the use to which they are now putting gas and electricity, but which seem to make it economically possible to continually extend service to provide other conveniences and necessities of daily existence.

The interest of the holding company is identical with that of the operating company. It of necessity must be the same because obviously the operating company must continue to grow and prosper if the holding company is to continue to supply it with money and counsel in ever-increasing amounts. The interest of the operating company is that the consumer have the best possible service through the latest improved facilities at rates low enough to permit the general use of the service for all of the functions for which it is economically suited. Whereas, the growth which is encouraged by low rates is important to the utility because it extends its business, develops a better load factor, and in turn permits the rendering of better service at still lower costs; it is also important to the consumer that rates be sufficient to provide earnings which will attract continuously the vast amount of capital necessary for improving plants and extending service. It is important for both of these interests, and they are inseparable, that the utilities be so managed and regulated that their service will aid in the prosperity of industry and in the elevation of the standards of health and comfortable living in the communities which they serve, for utilities prosper only in accordance with the prosperity of their customers.

Freedom of Action Essential

The holding company or utility investment company is entitled to the same freedom of action as any other business and it is that freedom which has enabled it to do its great work and to develop this great industry to a position not equaled elsewhere on this planet. This freedom of action of the holding company has made the service of gas and electricity continually cheaper by constant effort towards the better use and exploitation of natural resources; and by lowering of production costs of service and by the extension of these services not only to cities but to rural communities. The ambition of every far-sighted utility executive has always been, and will continue to be, to furnish the best service at the lowest rate possible in conformity with a good credit standing for the operating and holding company; and the ability of the holding company to help depends largely upon its ability to act with-



PACIFIC HEATING SYSTEMS

Easy to Install — Profitable to Sell

THE PACIFIC UNIT SYSTEM furnace is a very easy and profitable line to sell. It appeals to the prospect because it is economical to buy and use, and provides closely controlled heat to all parts of the house, or to any one part, at the touch of a button. It is a very desirable type of appliance from your standpoint, because our standardized parts make installation easy at low labor cost, and it is practically trouble-proof so that your servicing costs are little or nothing. It carries the good profit of a quality line. Made by the oldest and largest gas heating organization in the West—assurance of quality and cooperation.

The Pacific Multi-Tubular Burner

One of the reasons for the remarkable efficiency of Pacific Unit System furnaces is the Multi-Tubular Burner, developed by us. Instead of one burner, it is a group of burners, each with its independent supply of gas and air. Engineers say it is the most efficient heating element yet developed, and is obtainable only in Pacific Gas appliances.

Send for Literature on Complete Line of Gravity and Pressure Type Furnaces

Pacific Gas manufactures not only Unit Type furnaces, but Pressure Type furnaces for large buildings. Ask us to send you literature on these profitable lines.

Pacific Products

Gas-Steam Radiators
Pressed Metal and Cast Iron Radiators
Pipeless Floor Furnaces
Central Plant Furnaces
Pressure Type Furnaces
Radiant Fireplace Heaters
Automatic Water Heaters, Storage and Instantaneous

COMPLIES WITH NATIONAL SAFETY REQUIREMENTS AMERICAN GAS ASSOCIATION APPROVED

A. G. A. Approval

In addition to being guaranteed by us, the Pacific Gas Unit System furnace carries the Blue Star of the American Gas Association—an important thing to find on any gas heating appliance.

Pacific Gas Radiator

Gas Heating **Company** *Headquarters*

Roseberry and Walter Streets
Huntington Park California

Get in on Every Heating Job in Your Territory

out restrictions other than those of ordinary private business.

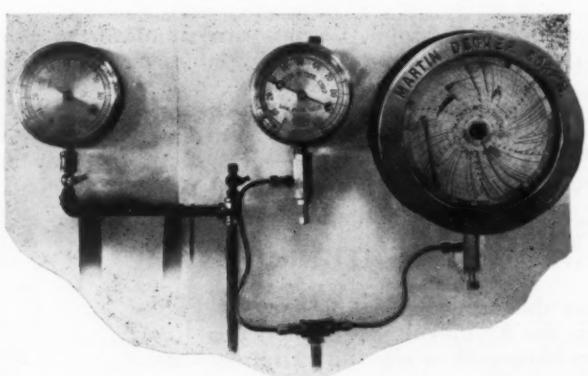
It is to the credit of the holding company that the small town plant with its intermittent service and its limited use has passed into history. There has come in its place a complete service at much lower rates to the smaller as well as to the larger communities. This, as we know in this state, has raised the standards of living in those essential back areas of farming country and in agricultural communities. In doing this, the holding companies have taken large risks in that their investment is in the junior securities of the operating companies. The senior securities are largely sold to the public. The latter have to be made good before those held by the holding companies are of any value.

In the early days, this was not as easy as it seems today. Reductions in rates have been made on the theory of increased future business and this faith in American growth and industry has been justified, fortunately for the holding companies. However, this did not remove all of the hazards nor did it invariably come to pass. Rates have been reduced below the point of an existing reasonable rate and extensions have been made into unprofitable territories in which the time necessary to prove them out has been longer than the operating companies could have withstood alone. Furthermore, this equity money has to be continually increased in a growing operating company if its financial structure is to be kept in a condition to assure it of good credit. "The position of the holding company is that of an enterpriser and as such it is entitled to the same freedom of any other private business."

Operating companies on the other hand have a monopoly of service which in most states is protected by certificates of convenience and necessity obtained before they are subject to direct competition. Being so favored over the general private business enterprise, the operating companies should, as they generally have done, cooperate to the fullest extent in fair, justifiable regulation of their service and rates.

Furthermore, since it is the desire of the utilities and the holding companies, because of good business practice, if for no other reason (and there are others) to see that good service is given at fair rates, and since the public is protected against the evils of monopoly, the holding company or investment company must be able to compete freely for the necessary money in the open market. The perfect combination for the best interest of the public is the regulation of the operating company with the freedom of the holding company. This freedom brings the advantage of the enterprise that financially strong private business always brings to establishments where its money is invested.

Under this combination, we find a long history of great growth and extensive service by an industry without whose services the present plane of living in these United States would not now be beyond that of the rest of the world; we find an industry whose size and extent of service is a monument to the principle of private ownership and operation, backed always by the initiative and energy of men and women in whom personal ability, industry and loyalty have once again proven this fundamental of progress in the United States.



Martin-Decker Utility Model Pulsation Dampener

THE Martin-Decker Corp. has produced the adjustable dampening unit known as the "Utility Model Pulsation Dampener" which is adapted for throttling the pulsations of gauges and recorders on compressors, pumps and pressure operated devices of all types. This device may be used either for a few inches of water or for several thousand pounds gauge pressure in liquids or gases. While dampening out pulsations, whether slow or rapid, there is no appreciable time lag. It is sensitive to either large or small changes in pressure and the gauge indicates the true mean pressure. It may be cleaned, if necessary, without disturbing the connections. It is not a needle valve, nor does it operate on the needle valve principle.

The accompanying illustration shows a gauge and recorder fitted with this device connected in parallel with an unprotected gauge on a compressor line. The recorder shown is fitted with a half-hour clock, so that each quarter hour division represents eighteen and three-quarter seconds. The response of the recorder to pressure changes from maximum to zero can be observed.

It is adaptable to low pressure manometers, U-tubes, and draft gauges, orifice meters and many other types of pressure instruments.

It is manufactured in two models; the "Regular" with brass body and stainless steel stem for usual installations; and the "All Stainless" for use under high temperatures, extremely high pressures and other installations where brass would not be adaptable.

R. W. Campbell Now With American Stove Co.

R. W. CAMPBELL is now associated with the American Stove Co., with headquarters in the Los Angeles office. He will contact utilities in Southern California and Arizona in the interests of the company, his appointment being effective September 1. Announcement of Mr. Campbell's appointment was made by E. P. Millikan, Pacific Coast manager for American Stove.

R. W. Campbell

Before joining the American Stove Co. organization Mr. Campbell was with the sales staff of the L. J. Mueller Furnace Co., and has had a number of years experience in the gas heating industry of the West. He was on the industrial engineering staff of the Southern California Gas Co. for several years, prior to taking the position of general sales manager and engineer for the Payne Furnace & Supply Co., which position he left to go with the Mueller Furnace organization.

Shawnee Franchise Goes to Western Service Corp.

In a special election at Shawnee, Okla., held August 6, the Western Service Corp. of Oklahoma City was awarded a franchise to supply natural gas to Shawnee. Earl R. Ernsberger, president of the Western Service Corp., announced that his company would spend $450,000 on the Shawnee distribution system. A top domestic rate of 44c is offered by the Western Service. The company proposes to secure its supply for Shawnee from the Oklahoma City field.

E. F. Hobbs Named Supt. of Bartlesville Gas & Electric Co.

E. F. Hobbs has been named to succeed T. F. Patterson as superintendent of Bartlesville Gas & Electric Co., Bartlesville, Okla. Mr. Hobbs has been with the company for the past 11 years, serving during the last four year as shop foreman. Previous to going with Bartlesville Gas & Electric Co. he was with the Doherty Research Bureau, headquartered at Bartlesville.

Stockholders of Central Public Service Increase at Rapid Rate

Central Public Service Corp. announces that the number of stockholders has increased at the rate of nearly 1,000 per month during the first six months of this year. Holders of the corporation's securities on January 1 numbered 64,767, while on July 1 the total was 70,706.

Coast Counties Crockett Office Enlarged and Redecorated

The office of the Coast Counties Gas and Electric Co. at Crockett, Calif., has been redecorated and remodeled during the past week. Floor space has been increased for the purpose of maintaining a display of appliances. The company headquarters at Santa Cruz.

Discover a new "Mother lode" in these western hills

Win new converts to gas heating with the facts on *push-buttonless* full automatic control

The Popular Q-20 Regulator Set

This is the low-priced control "package" that has proved so popular up and down the Coast. It consists of a plain thermostat, a magnetic gas valve of the required size, a specially designed transformer, the necessary length of 3-wire cable and staples. Use it to land those small home installations.

Have you told home owners the complete story of what it means to have *completely automatic* gas heating?

Give them the facts and you will be on the trail of bigger equipment profits and a faster upshoot in domestic load.

You don't have to go far for convincing evidence. A neighbor's enthusiasm may clinch the deal! Any man who has enjoyed automatic heating for a time is full of straight-from-the-shoulder testimonials.

He'll tell you that gas means *Comfort* — even heat at any temperature you like. He has no doubt about its *economy*—his heating bills have dropped to a figure he never hoped for with hit or miss manual control.

He'll say that *convenience* is an extra dividend that alone makes automatic gas heating worth while. He doesn't have to hurry home to meet every change of outside temperature — but just sets a little trigger on the thermostat and then forgets it.

Would he go back to the old wearysome push button game of "first too hot, then too cold?" His answer — plus your own explanation of Minneapolis-Honeywell complete automatic control — will help you convert domestic prospects into satisfied customers. Let us supply you with the facts.

Minneapolis-Honeywell Regulator Company

CALIFORNIA BRANCH
557 Market Street, San Francisco, California

DISTRIBUTORS
Portland, Seattle, Salt Lake City, Denver

DISTRIBUTORS

North Coast	Arthur F. Erickson Co. 315 Selling Bldg. Portland, Oregon	*Southern California*	English & Lauer 1224 South Pedro St. Los Angeles, Calif.	*Denver*	Daly Company 1635 Blake St. Denver, Colo.	*Salt Lake City*	Hawley-Richardson-Williams Co 204 Dooly Bldg. Salt Lake City, Utah

MINNEAPOLIS-HONEYWELL
Automatic Heat Controls

Good Showmanship Sells Water Heaters

(Continued from Page 29)

awarded. Each person attending was furnished a registration card, and given a chance to participate in the prize awards. In addition to the fact that the prizes tended to stimulate attendance, they also furnished good sales prospects.

DAILY PROGRAMS

In order to create added interest in the Show, and to further awaken a consciousness of the value of automatic water heating, special programs were conducted in the company's auditorium on the eighth floor of the building. These consisted of daily lectures by national and local domestic science and health experts who spoke on the value of hot water from the standpoint of convenience and health. There were also lectures by water heater dealers who demonstrated the proper use and care of water heaters in order to get the maximum efficiency and economy from their use. In addition, a very entertaining two-act play entitled "Getting Hot," written, directed and staged entirely by Public Service employees, attracted considerable attention.

As a further stimulant for attendance of these special programs on the eighth floor, three ornamental electric lamps were awarded as attendance prizes after each program, and a bath towel was given to each person who attended and registered.

Practically all means of publicity at the company's disposal were used in advertising the Show. Twelve thousand lines of display advertisements were released in the daily newspapers. Considerable time and care were given to the production of these advertisements. The teaser idea, always effective in advertising of this kind, was employed. A replica of "Old Faithful" was shown with a question mark, to arouse curiosity, and the promise that an explanation would soon be forthcoming caused the public to be on the look-out for something unusual.

Other means of publicity employed were two large interchangeable letter electric signs, which were used the week before and the week of the Show; street car cards were placed in the front and rear of all street cars during the Show; and a special street railway bulletin with a circulation of approximately 100,000 per week was dedicated almost entirely to the promotion of the Show; 15,000 pamphlets distributed to housewives by bill deliverers of the company were used for this purpose. In addition, some 4,000 direct mail invitations were sent to contractors, architects, prominent landlords, and other outstanding people of the city.

The attendance and general interest manifested in the Show, the number of prospects secured and sales already consummated, exceeded the expectations of both the company and the water heater dealers. Three days of unusually rainy and gloomy weather undoubtedly lowered the attendance considerably, but an attendance of better than 25,000 for the first Water Heater Show was considered creditable indeed.

Needless to say, from the registration cards both on the main display floor and the eighth floor, and from the discussion of the dealers with visitors to the Show, a very large number of live prospects were secured which will develop into future sales. The beneficial effects of the Show in the way of sales will be reflected over a period of several months.

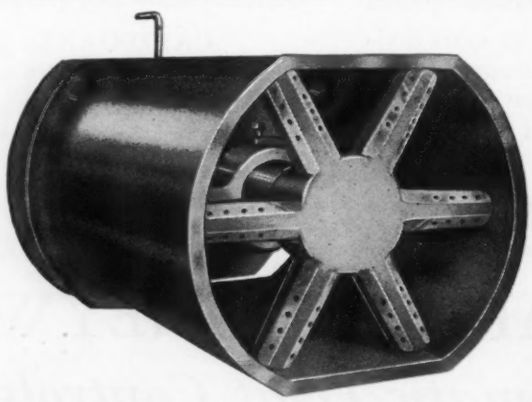
In order to cash in to the greatest extent on the interest aroused at this time, a special 60-day campaign was inaugurated, featuring the installation of water heaters for $1.00 down and 24 months to pay the balance. Purchases may be made either from the licensed master plumber, water heater dealers, or Public Service, and the installments, if the purchaser wishes, carried on the gas bill. More than 650 water heaters have been sold from July 1 to July 27.

The Show was staged under the general supervision of New Orleans Public Service Inc.'s Commercial Department, headed by W. E. Clement, with E. N. Avegno actively in charge. The creation of the geyser, fountains, window displays and decorative effects was achieved by H. M. Muller, and was the subject of very favorable comment. The women's committee, headed by Miss Bess Pique, rendered valuable service during the Show, through acting as hostesses during the evening. The young ladies welcomed visitors to the Show, courteously conducting them to various attractions of interest.

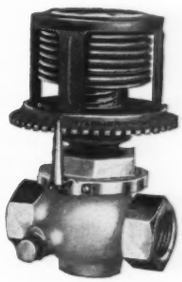
Specify
WALWORTH
VALVES
FITTINGS
for AND TOOLS
GAS
WALWORTH
General Sales Office
60 E. 42nd St., New York
WALWORTH CALIFORNIA CO.
235 Second St., San Francisco
WALWORTH COMPANY
809 Fourth Place, Los Angeles

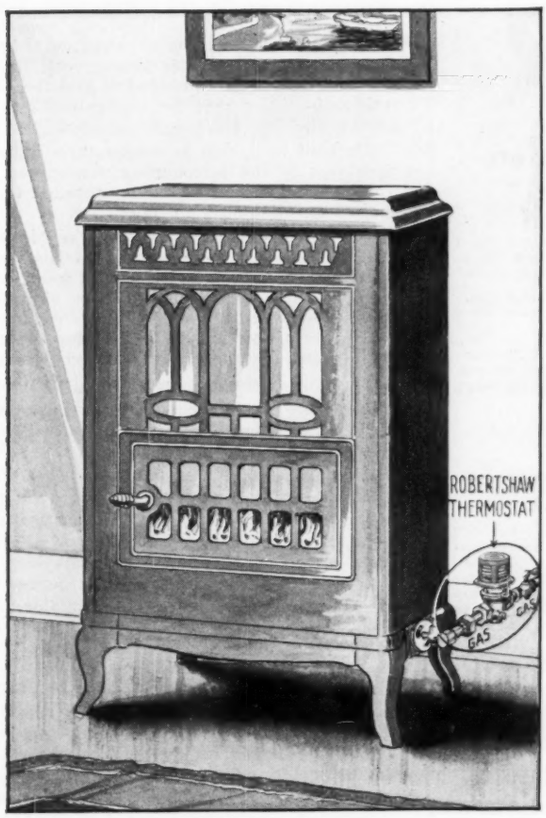
WORTHINGTON
PRODUCTS
COMPRESSORS
Stationary and Portable
PUMPS
All Sizes—All Types
For All Services
Any Capacity—Any Pressure
CONDENSERS
and Auxiliaries
DIESEL ENGINES
GAS ENGINES
FEEDWATER HEATERS
WATER, OIL and
GASOLINE METERS
MULTI-V-DRIVES
ROCK DRILLING EQUIPMENT
Rock Drills
Automatic Heat
Treating Machines
Forging Furnaces
Drill Steel
Accessories
CHROMIUM PLATING
Literature on request
WORTHINGTON PUMP AND
MACHINERY CORPORATION
Works: Harrison, N. J.; Cincinnati, Ohio; Buffalo, N. Y.; Holyoke, Mass.
GENERAL OFFICES: HARRISON, N. J.
District Sales Offices or Representatives in Principal Cities
WORTHINGTON
G-85

GAS
BURNERS
For
ALL INDUSTRIAL
PURPOSES
JOHN ZINK CO.
Oklahoma Natural Gas Bldg.
Phone 4-9838
TULSA, OKLAHOMA
★
Flameless Burners
Flame Burners
Short Flame Burners



Another ROBERTSHAW *Source of Extra Profit*





The ROBERTSHAW Space Heater THERMOSTAT

WHEREVER space heaters are used . . . either new or old . . . the Robertshaw Space Heater Thermostat will give you extra profits. It provides the economy of automatic control . . . just as essential in the gas fired space heater as in the gas range or the gas furnace.

The Robertshaw is small, compact, and attractively finished. Simple and durable, it is most easy to install at any time. And it is both automatic and ever dependable.

By adding this No. 2E Robertshaw to the space heater, the owner obtains that even, controlled heat which is such a vital safeguard of health and comfort. Be sure you know the attractive extra profits to be made with this much needed thermostat. Write today for the complete proposition.

ROBERTSHAW THERMOSTAT COMPANY
YOUNGWOOD, PENNA.

"Venturi" Direct-Fired Air-Dryer

(Continued from Page 34)

steam-heated coils with a maximum resulting air temperature of 250°F. Maximum capacity of dryer never exceeded 2000 lbs. of wet or 1600 lbs. of "dry" material per hour. The dried material was collected in a hopper, while the moisture-laden air was discharged into the atmosphere through a stack.

This form of air heater readily lends itself to automatic control of the drying operations which can be conducted with a wide variation in the different factors affecting them.

In nearly all drying operations, the control of temperature and humidity are probably the most important as affecting the quality of the products handled.

The maximum temperature of the air entering the dryer (at outlet in tube C) as well as leaving the dryer (in exhauster H) can be independently governed by controlling the gas supply to the burners. An emergency gas shut-off valve active immediately in case of any interruption in the supply of air by the fan is also a necessity. All of these automatically controlled valves can be inserted in series in the main gas line to the burner manifold, making for a simple and inexpensive, but effective system of control. Temperature and humidity recorders show conditions at inlet and outlet of dryer. With a given fan capacity, the feed to the dryer can then be increased until the discharged dried product begins to show more than the permissible amount of moisture.

Feeding the heated air concurrently with the wet material always makes higher air temperatures for drying permissible; this for the reason that changing of the water into vapor by the heated air, almost instantly lowers the temperature of the latter. High air temperature permits of best gas utilization; i.e. best fuel economy.

In order that the least possible quantity of air may absorb and carry away the greatest possible amount of moisture from the dryer, it is necessary that this air leave the dryer at the highest permissible temperature. This same quantity of air must therefore enter the dryer at a temperature still higher, so that in its drop to the exit temperature sufficient heat is liberated to heat the material to be dried and evaporate its contained water. As the heat available for drying with air is that quantity which is needed to heat the air, it is self-evident that the higher this air is heated, the less air has to be used.

Air used in drying at temperatures higher than that of the surrounding atmosphere is always expelled at a higher temperature than that of the atmospheric temperature.

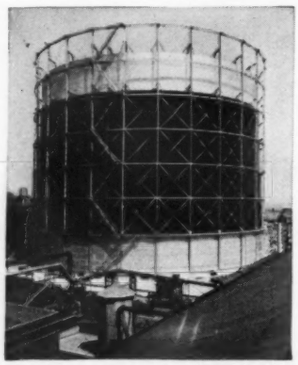
For this reason recirculation of the "drying air" makes for a more economical heat balance than if fresh atmospheric air were constantly heated, and this with its absorbed moisture expelled in toto. If S_m is the mean specific heat and T_a the temperature of the atmospheric air and T_e the exit temperature of the air discharged from the dryer, then $QS_m\ (T_e—T_a)$ is the quantity of heat that will be saved by returning QS_mT_e to the fan. Temperature of QS_mT_e is then raised to T_i degrees and QS_mT_i carried into the dryer. $QS_m\ (T_i—T_e)$ is then the total heat available for evaporating water. Neglecting radiation and other losses of the system QS_mT_e then merely becomes the heat-carrying or circulating medium, and the gas burned is the energy $QS_m\ (T_i—T_e)$ available for evaporating water. This method of operating dryer is indicated by dotted line of "air" circuit to fan and dryer.

As gradually more and more air is being replaced with superheated steam, this becomes the principal circulating medium which is reheated for evaporating the water in the material to be dried.

Under these conditions fresh air is still drawn into combustion space B of the heater and the gas can be burned perfectly, which would not be possible if it were attempted to burn it in an atmosphere of steam, nitrogen and carbon dioxide, which is the recirculating medium.

When the dryer is operated in this manner, and exhaust fan must be used in place of the stack with natural draft; otherwise the main recirculating fan would also pull fresh air down the stack into the circulating medium and make the regulation of the amount of water to be evaporated and expelled from the dryer difficult. The exhaust fan would then be set to exhaust a constant quantity of vapor, in direct relation to the amount of water that must be expelled from the material being dried, while the main fan becomes chiefly a recirculating fan of the heat-carrying medium. This medium is then

GAS HOLDER PROTECTION



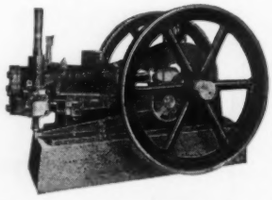
Complete—Long Lived—Economical

A great many companies have been using NO-OX-ID on their gas holders for years and are continuing to use it. Many additional companies are coming to NO-OX-ID, as they see its excellent results. This invites attention from all companies who have been paying excessively for short lived protection.

Prepare to learn of an attainment in thoroughness, longevity and economy of protection entirely new to you and desirable from every viewpoint. Data, references and estimates will be submitted gladly. Investigate!

Dearborn Chemical Company
LOS ANGELES:
807 Mateo Street Phone TRinity 3385
SAN FRANCISCO:
421 Bryant Street Phone DAvenport 658

NO-OX-ID
IRON-RUST
The Original Rust Preventive



Hey—! You Gas Men—!
Wake Up!

If some other power is better than Gas Engine Power, why don't you use it to pump gas through your pipe lines?

Charter Gas Engines will save your customers as much on their power cost as your gas engines save you.

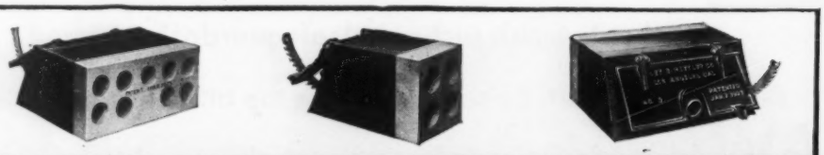
If you were paying power bills proportional to the average private citizen, could you pump gas 1000 miles through a pipe line profitably?

Remember!

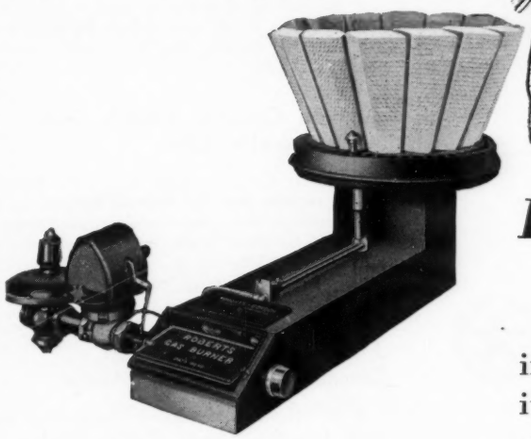
One average size Gas Engine will burn as much gas as 50 residences; besides, you need this Industrial Load to balance your demand.

Charter Heavy Duty Slow Speed Engines are made in sizes 25 to 200 H.P. and our prices are low. Write for our **Educational Bulletin No. 23**—It answers about every question you could think to ask about Natural Gas Engine Power.

CHARTER GAS ENGINE CO.
Sterling, Ill., U. S. A.
(Makers of dependable gas engines since 1880)



Mettler Entrained Combustion Gas Burners
FOR ALL Purposes
Kinds of gas
Pressures
406 S. Main St. LEE B. METTLER. CO. Los Angeles Cal.



Is talking gas for home heating

GAS for home heating is rapidly coming into its own. Everywhere—everyone is talking it.

And therein lies your opportunity. If gas companies are ever to ride on the crest of the wave of popularity for their product—that time has arrived.

Why not take advantage of this opportunity now?

ROBERTS-GORDON
APPLIANCE CORPORATION
CURTISS BLDG. BUFFALO, N. Y.

Trade Mark

ROBERTS
CONTROLLED
GAS HEATING UNIT

LATTNER

Industrial Gas BOILERS

Recently Patented—

THE H. E. FLUELESS

No flues—No tubes—No coils

Revolutionary in Construction

1 H.P. 2 H.P. 3 H.P. 4 H.P. 5 H.P.

"No tubes but equal efficiency."

P. M. LATTNER MANUFACTURING CO.

Factory
516 12th Avenue S. W.
Cedar Rapids, Iowa

Warehouse Distributor
2646 South Hill Street
Los Angeles, California

COMBUSTION EQUIPMENT LEAHY LOS ANGELES, CAL. U.S.A.

ALL DAY EVERY DAY

SHUT downs are expensive. If the cause is power shortage, they are avoidable. Continued operation is the Leahy motto—all day—every day! Leahy Dual Combustion Furnaces are constructed with the most modern developments in heating engineering. They burn either gas or oil with equal economy. In the case of the failure of one fuel, the other may be substituted immediately without loss of time or efficiency.

◆

LEAHY MANUFACTURING CO
Established 1902
1804-1812 East Eighth Street, Los Angeles, California
E. A. CORNELY INC.
1452 Bush Street San Francisco, California

MUELLER GAS ERA BOILERS

fill the most exacting demands for thoroughly dependable and economical gas-fired steam and hot water heating equipment.

For details, write:

L. J. MUELLER FURNACE CO.,
334 S. 2nd St., Milwaukee, Wis.

Makers of a complete line of gas-fired boilers and pressed steel and cast furnaces

being reheated at a definite rate, determined by the amount of water to be evaporated, radiation, and other losses.

Operated in this manner the system is highly flexible and can be arranged to meet a variety of conditions in the drying of different materials with a minimum of fuel used.

City of Miami Cancels Contract for Natural Gas Purchase

The city of Miami, Okla., which on April 28, 1931, voted $150,000 in bonds for establishment of a municipally owned natural gas distribution system, has cancelled contracts with J. N. Sloan for purchase of natural gas to supply the proposed system. Mr. Sloan financed the Miami election after he had been given a contract to supply the city with gas from a pipe line which he expected to construct from the Nowata gas fields about 45 miles from Miami. City authorities of Miami expect to deal with others for gas for the proposed municipal distribution system.

Peoples Gas Light & Coke Co. Reports on "Therm" Billing

Following a year's use of the therm basis for billing gas customers, the Peoples Gas Light & Coke Co. of Chicago reports that only 460 of the 900,000 customers asked to have their gas bills determined on the cubic foot method as previously used.

The therm basis was adopted recently by the Central Illinois Public Service Co. of Springfield, Ill.

Southern Counties Reports Gain in Refrigerator Sales

Southern Counties Gas Co., Los Angeles, Calif., reports that the sale of Electrolux gas refrigerators has increased appreciably in the past 60 days, with 85 sold during June and 113 in July of this year, as compared with 61 and 93 in the corresponding months of last year.

J. N. Hickman Named Asst. Commercial Manager at Austin

J. N. Hickman, formerly commercial manager for the Kansas Public Service Co., Lawrence, Kan., has been named assistant commercial manager of the Texas Public Service Co., Austin, Texas. Both companies are subsidiary to Peoples Light & Power Corp., New York.

Liberal Gas Co. Announces New Rate Schedule

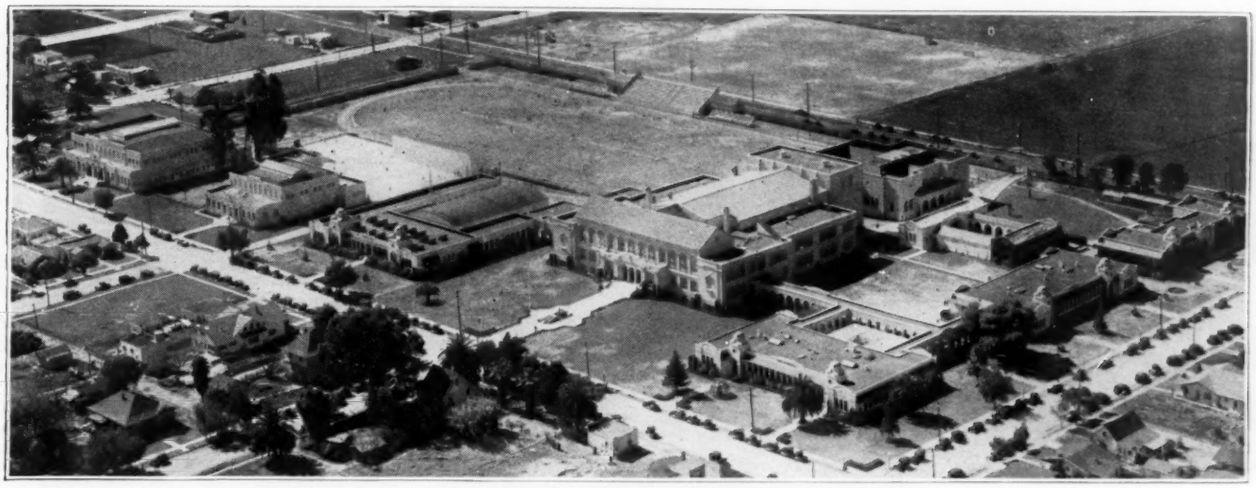
Effective August 1, the Liberal Gas Co., Liberal, Kan., has reduced its rates for natural gas service. The base rate is 50 cents per 1,000 for the first 20,000 cubic feet or fraction thereof.

Fort Crockett Gets Service

Fort Crockett, Texas, expected gas service some time in August from the mains of the Texas Cities Gas Co., of Galveston, Lone Star subsidiary. Headquarters for Texas Cities are maintained at Dallas.

Erick Votes Gas System Bonds

The town of Erick, Okla., has voted to issue $25,000 in bonds to construct a municipal gas system. Central States Power and Light Corp. now serves the town.



Above is one of the 700 schools in Southern California that are heated with Clow Gasteam — Compton High School, Compton, California

MORE THAN 700 CLOW GASTEAM EQUIPPED SCHOOLS IN SOUTHERN CALIFORNIA—PROVE THE ACCEPTANCE OF THIS HEATING SYSTEM

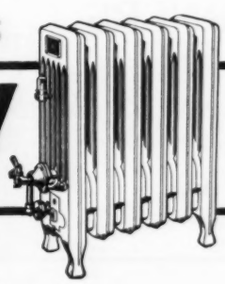
Schools . . . form a most important market for Clow Gasteam Radiators. That this market has tremendous possibilities is evidenced by the fact that already more than 700 schools in Southern California alone, are heated with Clow Gasteam.

This heating system offers exclusive advantages. The unit control feature makes it possible to provide steam heat at less cost than with any other system. The simplicity of construction and operation of the radiators assures long life with little or no servicing. The radiators are compact and good looking.

Installation is simple and inexpensive—allowing a considerable merchandising profit on the radiators themselves. Sell your share of this large and profitable market that means a dependable gas consumption and an off-peak load.

JAMES B. CLOW & SONS 201-299 N. Talman Avenue, Chicago

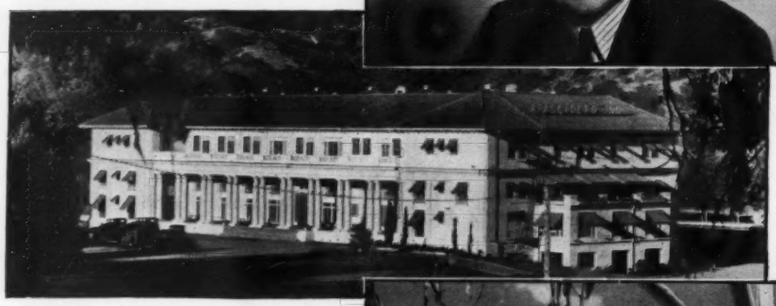
CLOW GASTEAM

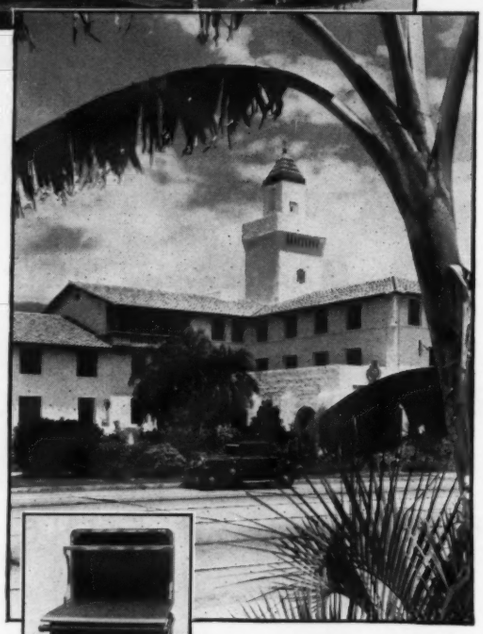


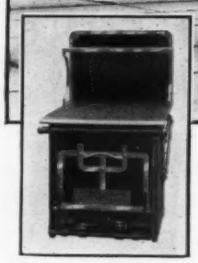
Listed by Underwriters Laboratories

Approved by A. G. A. Testing Laboratory

IF IT'S A BARTHOLOMEW HOTEL . . . IT'S A MADSEN KITCHEN







Col. Fred Bartholomew, who came to California several years ago to make an outstanding success of the Atascadero Inn, is almost a national institution. Naturally, with his mature experience, he would have Madsen ranges in the kitchens of the Inn. Quite as naturally, after what he learned about Madsen at Atascadero, he would specify Madsen equipment for the kitchens of his beautiful new Vista Mar Monte Hotel, on the beach at Santa Barbara.

There is a reason for this almost universal preference for Madsen kitchen and dining room equipment on the part of the ablest hotel and restaurant men of the West. Whether you are planning just a small quick lunch place or a hotel that is to set another world mark for luxury, it will pay you to know about the unusual economy and the splendid efficiency of Madsen gas-fired kitchen equipment, Madsen self-aligning counter chair bases, and Madsen cast iron table bases. Your request will bring valuable literature by return mail.

1. Col. Fred Bartholomew.
2. The Atascadero Inn.
3. The new Vista Mar Monte, on the beach at Santa Barbara.

MADSEN HOTEL AND RESTAURANT KITCHEN EQUIPMENT

SOLD BY LEADING EQUIPMENT DEALERS

MADSEN Iron Works, Ltd.

P. O. Box 601, Huntington Park, California
(Suburb of Los Angeles)
San Francisco Factory Representative
Fred R. Sanford, 631 Second Street

FORNEY

COMBINATION GAS and OIL BURNERS

For Power Plant and Industrial Uses

Write for Literature and List of Installations

FORNEY COMBUSTION ENGINEERING CO.

513 CENTRAL BANK BUILDING, DALLAS, TEXAS

Cooper-Bessemer Corp. Issues Bulletins on Type GA Units

The Cooper-Bessemer Corp., Mount Vernon, Ohio, recently issued two bulletins giving information on the Type GA single and twin-cylinder pumping and drilling engines built by the company.

The first bulletin covers the single-cylinder engine, rated 25- to 60-B.H.P. The 12 pages are devoted mostly to illustrations and explanations of important engineering points such as main frame, roller bearings, crankshaft, enclosed crankcase; access to moving parts; top location of air valve; governing, cylinder construction, connecting rod, gas injection pump, etc.

The second bulletin deals with the twin-cylinder "deep-hole" engine, rated 65- to 130-B.H.P. Illustrations, data, and technical explanations are handled in practically the same manner as in the bulletin describing the single-cylinder engine. The company is distributing this literature from the Mt. Vernon office and from the district offices.

Stockwell Is Rate and Valuation Engr. for Empire Public Service

Announcement has been made of the appointment of B. P. Stockwell, of Bristow, Okla., manager for the Oklahoma Utilities Co. in the state since 1927, to the position of rate and valuation engineer for the Empire Public Service Corp., holding company for the Oklahoma concern. The Empire company, whose general offices are in Philadelphia, has utility operations in about 200 cities and towns in 11 states.

Mr. Stockwell's headquarters will be in Oklahoma City.

The gas operations of the Oklahoma Company will be directed from Bristow by E. A. Smith as general superintendent.

Manufacturers Section, A.G.A. To Meet at Detroit, Sept. 17-18

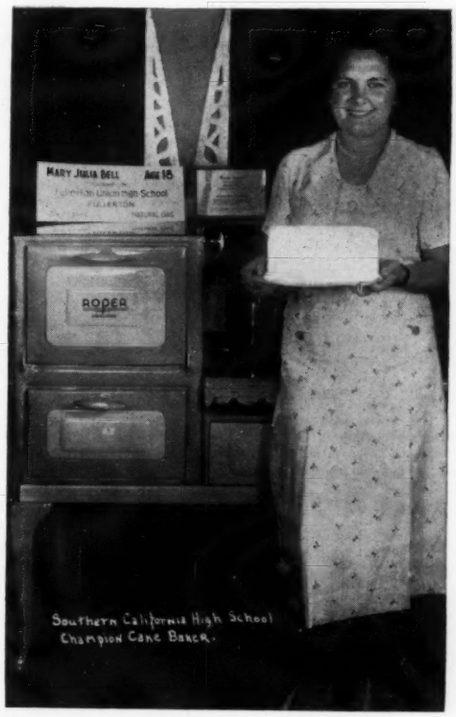
Members of the Manufacturers Section, American Gas Association, have been called to meet in annual session, September 17-18, at the Book-Cadillac Hotel, Detroit, Mich. Apart from the general meeting, which will occupy the opening day, there will be separate meetings of the gas range, water heater and space heater groups. It is anticipated that about 500 manufacturers of gas appliances and equipment will be on hand for this session.

Alpha Lux Co., Inc., Opens Branch Office in Chicago

The Alpha-Lux Co., Inc., of New York City has recently opened a branch office in Chicago at 343 South Dearborn St. From its shipping points now established at New Orleans and Chicago the company announces that it can ship its Lux material to the west and southwest at about the same price that it can ship to the middle west.

Texas Gas Utilities Co. Is Constructing Town Border Station

A new town border station is being constructed for the Texas Gas Utilities Co. at Uvalde, Texas. The company headquarters at Del Rio. Three new gas wells have been brought in during the past few months near Uvalde, and these are being connected with the line which serves Uvalde, La Pryor, Crystal City and Carrizo Springs.



3 Acknowledged Winners:—

THE ARTIST—
THE RANGE—
THE PRODUCT—

Walter Thurber first had the idea: A cake contest to "stimulate the waning art of baking amongst high school girls."

The contest proved a popular one . . . . . Soon every district of the Southern Counties Gas Co. was holding a local contest . . . . . Other gas companies in Los Angeles were interested . . . . . An all Southern California championship tourney was arranged . . . . . Civic groups and women's clubs lent their hearty support.

3000 girls participated in the preliminary contest . . . . . 23 local champions were selected . . . . . The stage was carefully set . . . . . In the Shrine Civic Auditorium on 23 ranges, 23 enthusiastic participants worked skillfully and carefully for the coveted honor.

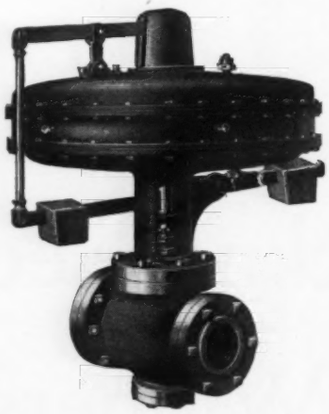
Given the choice of any stove they might elect to use, 7 of the contestants asked for Ropers . . . . . 23 perfect cakes produced, but one more perfect than all the rest . . . . .Mary Julia Bell, 18, of the Fullerton Union High School, was awarded first prize by the discriminating judges.

To the prize winner Roper offers congratulations,—pleased that this company's range played a part in this demonstration that among our coming generation the domestic arts still flourish.

George D. Roper Corp., Rockford, Ill.

C. B. Babcock Co., 135 Bluxome St., San Francisco
Pacific Coast Branch

Relief for Your Tanks



Protection for Your Meters

CF

Vacuum Relief Valve

IN case of line stoppage or other causes that result in the pulling of a Vacuum in storage tanks and purifiers, this Regulator comes quickly to the rescue. It is placed in a line between suction and discharge of compressor so that, should the pressure in the suction line to the compressor drop to zero, the Relief Valve will open and relieve the vacuum tendency. For a vacuum of 8 oz. or less, use the Duplex Regulator shown above. For higher vacuums, use the single diaphragm Vacuum Relief. Action is reliable. Thousands of meters and tanks have the constant protection which this C-F offers you.

The Chaplin-Fulton Mfg. Co.

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in all Sizes From 1 Inch to 24 Inches; For All Service 1 oz. up to 2,000 lbs. Pressure to Square Inch.

28-40 Penn Avenue Pittsburgh, Pa.

REPRESENTATIVES:

WESTCOTT & GREIS, Inc.
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Or Any Jobber

T A P P A N

Supremacy

is not a newly-won achievement, but an old and accepted standing in the eyes of gas appliance men and the public alike. No other gas range combines so many outstanding superiorities into such a perfect whole—the TAPPAN Insulated Oven gas range.

H. R. Basford Co.
665 Howard St.
San Francisco

H. R. Mayer
1001 E. 1st St.
Los Angeles

F. W. Schwab
2512 N. Stevens
Tacoma

Gilbert Estill Now Gas Measurement Supt. for Oklahoma Natural

Gilbert Estill has been appointed to the position of gas measurement superintendent with the Oklahoma Natural Gas Corp. of Tulsa, Okla. Mr. Estill entered the employ of the company in 1917 in the gas measurement department, and during the past 14 years has worked up to his new position as head of a department which controls the expenditure of several million dollars a year for gas purchased. The system of records which Mr. Estill has set up is considered a very efficient one by the gas industry in the West.

Road Construction Camp Is Equipped With Gas Service

The Northwest States Utilities Co., headquartered at Great Falls, Mont., recently equipped a road construction camp near Sheridan, Wyo., with natural gas. The camp is served through a temporarily constructed lateral. Work will be conducted by the construction company from the present camp for about a month, at which time the site will be moved approximately 20 miles, and will again be connected up for service through a temporary line. The camp consumes about 450,000 cubic feet per day, using the gas in the cookhouse, boiler, gravel drier and three engines of 175-, 150-, and 125-H. P.

Oil Field Shutdown Not Hindrance to Gas Industry

Leading gas engineers of Oklahoma state that there will be no serious effect on the gas supply for the public, following the closing down of oil production. Practically all gas sold to consumers is from straight gas wells not affected by the shutdown. Residue gas from oil wells is cut off, but is not an important factor in the gas supply at this time. Sales of gas for drilling purposes will be lost to gas companies and sales to refineries may be curtailed, but a shortage of supply for the general public is not anticipated.

Power Corp. of Canada Wants to Serve Regina

The Power Corp. of Canada has placed a proposal before the city council of Regina, Sask., in which the company plans to bring gas from the Bowdoin field in Montana, 175 miles southwest, to Regina. Cost of the line is estimated at $8,000,000. It is reported that the offer has been tentatively approved by the Regina city council.

Britton, Okla., to Vote on Franchise September 17

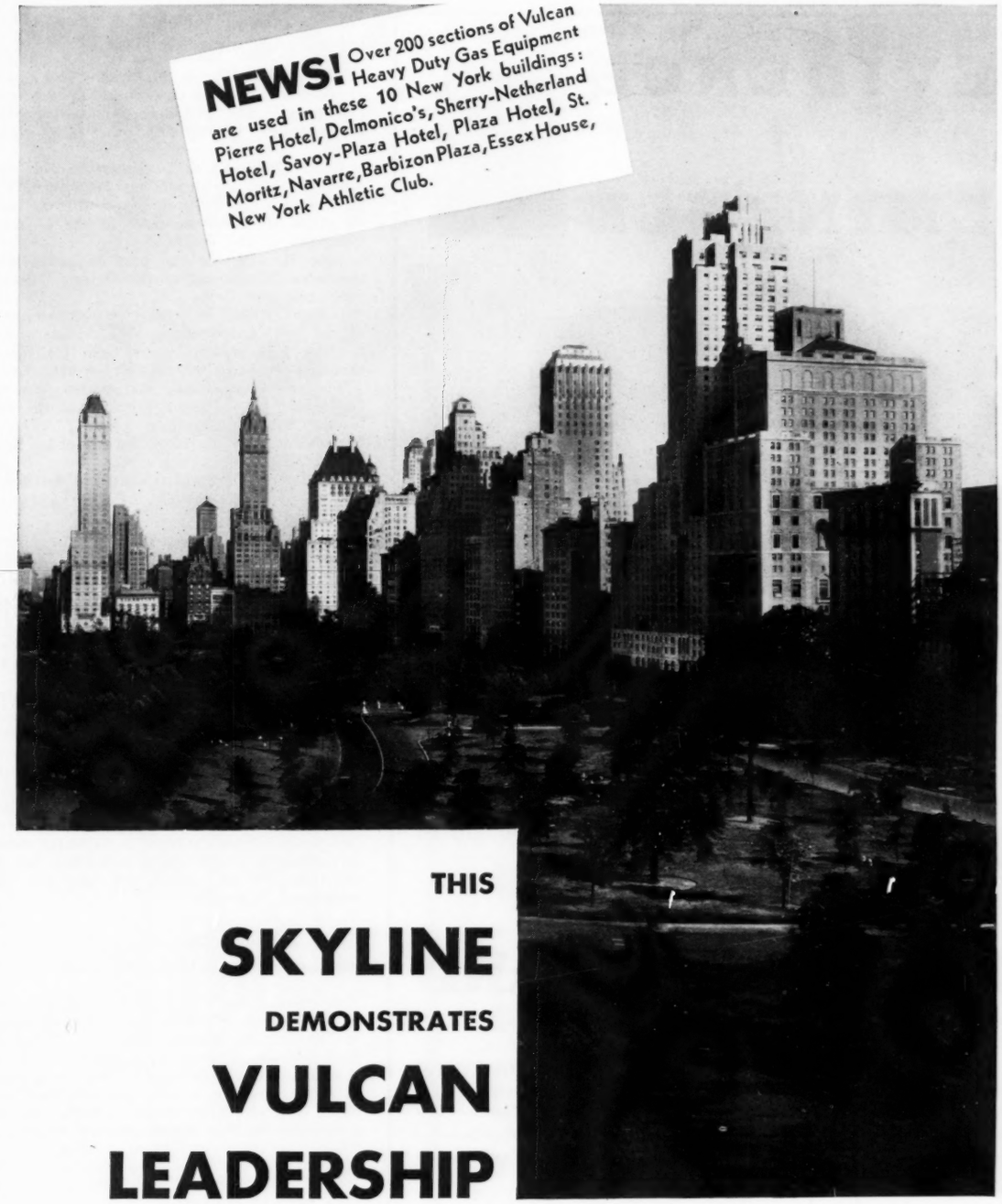
The city council of Britton, Okla., has voted to submit a gas franchise proposal by the Western Service Corp. of Oklahoma City on September 17. The company offers a rate of 44 cents per M.c.f. with a five per cent gross receipts tax to be paid to the city.

Vote $10,000,000 Bond Issue

Northern States Power Co., Minneapolis, Minn., has been authorized to issue $10,000,000 in bonds, which are being offered by Harris, Forbes and Co.

Lake City Franchise Granted

Iowa Public Service Co., Sioux City, has been granted a franchise for the service of natural gas in Lake City, Iowa.



NEWS! Over 200 sections of Vulcan Heavy Duty Gas Equipment are used in these 10 New York buildings: Pierre Hotel, Delmonico's, Sherry-Netherland Hotel, Savoy-Plaza Hotel, Plaza Hotel, St. Moritz, Navarre, Barbizon Plaza, Essex House, New York Athletic Club.

THIS SKYLINE DEMONSTRATES VULCAN LEADERSHIP

VULCAN GAS EQUIPMENT...

HEAVY-DUTY GAS COOKING APPLIANCES FOR EVERY REQUIREMENT OF HOTELS, RESTAURANTS, CLUBS, HOSPITALS, SCHOOLS AND OTHER INSTITUTIONS

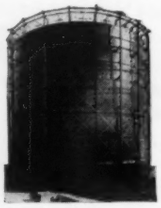
● Here, all in one small section of upper New York City, are shown ten important buildings where Vulcan Heavy Duty Gas Cooking Equipment has been installed; where Vulcan superiority is unquestioned. Buyers appreciate it—the moment they know about Vulcan . . . The big job is to *get in* and *tell* them how the new 1931 Vulcan Equipment cuts cooking costs, speeds up service and improves cooking . . . why they should remodel now. We want to help you in your sales efforts on Vulcan. Let's get together . . . Let's find out the *problems* of your prospects . . . then work together to *solve* them . . . with Vulcan! (Write for Catalog of new 1931 Vulcan Equipment)

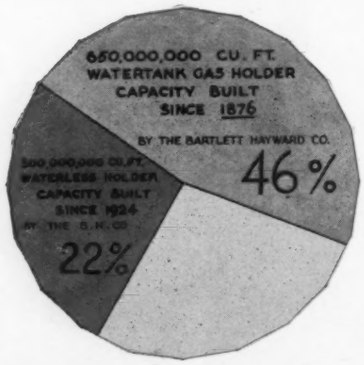
●

STANDARD GAS EQUIPMENT CORP., 18 EAST 41ST STREET, NEW YORK CITY

NEW YORK • BALTIMORE • CHICAGO • BOSTON • BIRMINGHAM • Pacific Coast Distributor: Northwest Gas & Elec. Equipment Corp., Portland, Oregon

EVIDENCE *of* EMINENCE





68 Per Cent by Bartlett Hayward

This circle represents approximately 1,400,000,000 cu. ft. of Gas Holder capacity in service in the United States (according to U. S. Dept. Commerce).

The Bartlett Hayward Company has erected since 1876 approximately 950,000,000 cu. ft., including approximately 300,000,000 cu. ft. Waterless Holder capacity ranging in sizes from 500,000 to 20,000,000 cu. ft.

THE

BARTLETT HAYWARD

COMPANY

BALTIMORE — NEW YORK

Coal Gas, Carburetted Water Gas, Blue Water Gas, By-Products Plants—De-Brouwer Charging and Discharging Machines—Waste Heat Boilers—Purifiers—Tar Extractors—Condensers—Feld Scrubbers—Fast's Couplings—Tanks—Gas Holders.

√check

your costs on

Space Heater Radiants
Back Walls
Tunnel Radiants
Leaning Baffles
Radiant Sticks
Burner Tips
Skeleton Cups

gas appliance refractories. Genceraco Refractories are clean-cut and highly resistant to thermal shock. Check your costs, we will gladly send an estimate.

GENERAL CERAMICS COMPANY
71 West 35th St., New York, N. Y.

Hacker Pipe & Supply Co. Is Newly Organized in Calif.

The Hacker Pipe & Supply Co. is a newly organized California corporation operating in Los Angeles and will engage in selling pipe, pipe fittings, valves and other gas equipment.

J. R. Dickinson is president of the new concern. Mr. Dickinson has been with The Grinnel Co. for 36 years and for the past 12 years has been president of the Grinnell Company of the Pacific.

Jack Hacker, for the past 35 years with the sales department of the Grinnell Co., is vice-president.

Jerry O'Leary has been named secretary of the new corporation. Mr. O'Leary has for the past several years been California manager for the Chapman Valve Mfg. Co.

The new organization will distribute to the California gas industry products of the following firms: Chapman Valve Mfg. Co.; Malleable Iron Fittings Co.; Kuhns Bros. Co. Jones & Laughlin Steel Corp. S. R. Dresser Mfg. Co. Borden Co.; and the Stockholm Pipe & Fittings Co.

Successful Six-Weeks Water Heater Sale by Community Natural

Two prizes of $25 each were awarded following the close of the six weeks water heater sale on the Community Natural Gas Co. system, and bonus checks were earned by many of the employees.

C. C. Hale, merchant dealer at Farmersville, Texas, won the award for that classification, and H. H. McMichael, district manager at Hugo, Okla., won the $25 award for the greatest number of heaters sold by an employee in charge of a district.

Bonus checks ranged from $60 to $15, and were distributed on the following basis: For the first heater sold by a merchant dealer or employee, $1, for the second $2, for the third $3, for the fourth $4, and for each additional heater $5.

Arizona Power Planning Improvements to Prescott Plant

Arizona Power Co., Prescott, Ariz., plans to improve the Prescott gas plant, according to an announcement made by Malcolm Bridgewater, general superintendent of the company. Changes involve the replacement of old machinery, a new gas scrubber, new pump and two new stacks. Cost of the improvement will be approximately $10,000.

Oakland, Carson and Walnut Get Gas in August

Residents of Oakland, Carson and Walnut, Iowa, expected to have natural gas service some time in August from the lines of the Missouri Valley Pipe Line Co. Supply for these towns will come from the Council Bluffs extension.

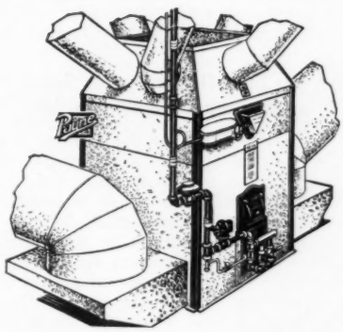
Luther Votes Renewal of Franchise to Oklahoma Natural

Luther, Okla., has granted a 25-year gas franchise to the Oklahoma Natural Gas Corp., Tulsa, Okla. The present franchise of the company expires shortly.

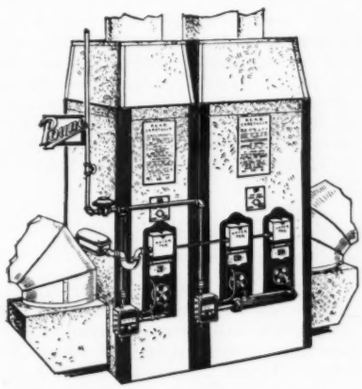
80,000,000 Cubic Foot Gasser

A wildcat gasser is reported on production in northern Shelby County, Texas, near Logansport, south of the Bethany field. The gasser is reported to be producing about 80,000,000 c.f. daily.

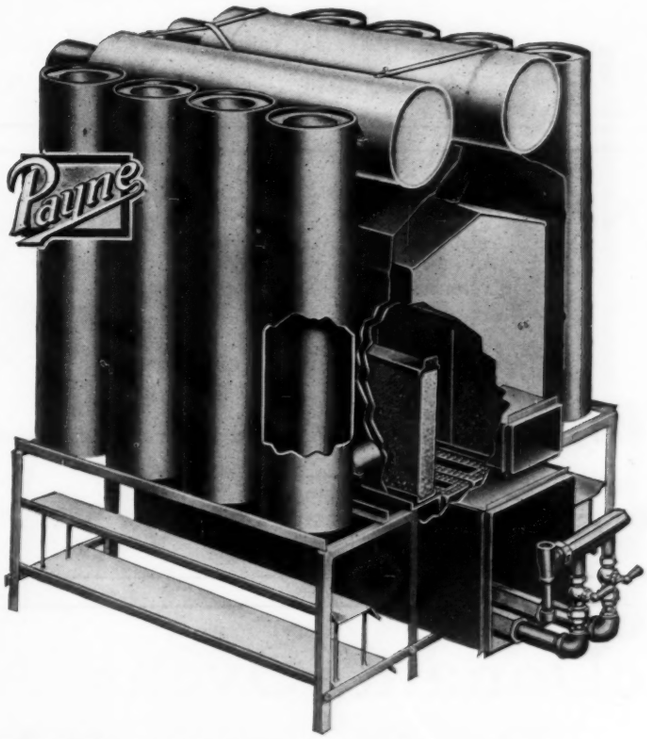
PERFECT Combustion, more active radiation . . . *perfect* Gas Furnace Efficiency!



Payne Central Furnace with cold air return—used in homes which are easily heated from one central source.

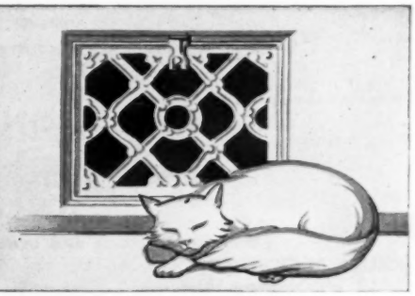


Battery of two Payne Unit Furnaces, each with cold air return—used to heat two separate rooms or two natural groups of rooms.



PAYNE GAS FURNACES make the most of the natural superiority of gas for fuel. Careful design and construction of firebox and burner insures perfect combustion. Heating elements have more active radiation surface—hence, greater heating capacity for the same amount of fuel. Rust-resisting ingot iron is used throughout, welded at all seams and joints—insuring absolutely gas-tight construction. Complete details will be sent gladly, on request.

PAYNE GAS FURNACES



Dealers

The Payne Gas Furnace Franchise for your town may be open. Write today for new Catalog and Proposition!

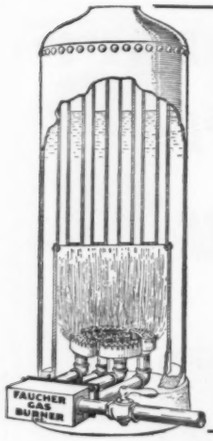
PAYNE FURNACE & SUPPLY CO., Inc.

Beverly Hills, California

There is a "Payne Heat" System for Every Building and Climate!

Payne Heat

Factory Units
Unit Furnaces
Floor Furnaces
Central Furnaces
Pipeless Wall Units
Industrial Installations



101-B Faucher Gas Burner applied to 6 H.P. Upright Boiler

Proven very efficient and economical. Also excellent for varnish kettles. Operates noiselessly.

FAUCHER GAS BURNER, INC.

P. O. Box 5031 DALLAS, TEXAS

Newman Gas Equipment Co.

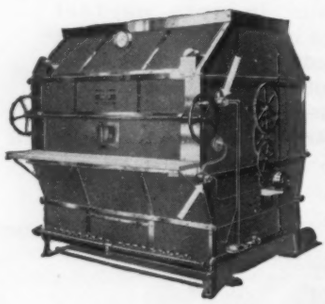
Industrial and Commercial Burners

Upshot Burners for Ideal Boilers

Bailey Regulators for Gas Fuel and Pressure Regulation

447 Sutter Street San Francisco Ph. GA 7833

McDonald Ovens Are Gas Business Builders



In keeping with the modern trend in all lines, the Bruce McDonald Company is making it possible for the progressive baker to enjoy the benefits and efficiency of gas heat. The 1931 McDonald-Made Meek Reel Oven has thermostatic heat control and is economical enough in its fuel consumption to make it a practical oven for the average baker. We will help you sell the bakers in your community on burning gas. Send for complete information. Use the coupon below.

BRUCE McDONALD COMPANY
Kansas City, Mo.

Also Manufacturers of

RED DEVIL OVENS

(Warehouse stock and branch office in Los Angeles)

BRUCE McDONALD CO.
2019 Washington St.
Kansas City, Mo.

Please send me complete information on McDonald-Made Meek Reel Ovens and on Red Devil Cabinet Ovens.

Name .....
Firm Name .....
City ..... State .....

Oklahoma Companies File Voluntary Rate Reductions

Many gas companies in Oklahoma are filing voluntary gas rate reductions. Companies that have filed reduced rate schedules with the Oklahoma Corporation Commission since July 1 include the Cimarron Utilities Co., Billings Gas Co., State Fuel Supply Co., Standard Gas Co., Pawhuska Oil & Gas Co., Oklahoma Power & Water Co., Community Natural Gas Co., Consolidated Gas Service Co., Southwestern States Gas Co., Vinita Fuel Co. and the Osage Producers Gas Co. The city of Mangum, Okla., which owns its natural gas distribution system, has also reduced gas rates effective August 1.

Empire Investment Co. to Serve "Manufactured" in Snohomish

It is reported that the Empire Investment Co. has completed negotiations with the Puget Sound Power & Light Co. of Seattle, Wash., for the use of its transmission line from Everett to Snohomish, Wash., and for the distribution system in Snohomish. Empire Investment Co. was recently granted a franchise for the service of gas in the town, and plans to resume the service discontinued by Puget Sound Power & Light Co. some years ago. Gas from the Everett plant of the latter company will be distributed in the town.

Northern States Power Co. Reports Earnings Increase

Northern States Power Co., Minneapolis, Minn., reports a gain in earnings for the 12 months ended June 30, 1931, over the previous 12-month period. Gross earnings for the 12 months ended June 30, of this year were $33,690,458 as compared with $33,084,470 the previous year. Net earnings for the 12 months ended June 30, 1931, were $16,925,349 as compared with $16,846,365 in 1930.

Service Soon to Start in Southeast Louisiana Cities

United Gas Public Service Co. reports progress on the extension from its Bogalusa line which will serve Covington, Slidell, Hammond, Ponchatoula, and other Louisiana towns. Texas Construction Co. is building the line which will be operated by the United organization. Louisiana Power & Light Co., Algiers, La., will serve the gas in those towns. Twenty-six miles of 8-inch pipe are being laid, between 55 and 60 miles of 6-inch, and several miles of 3- and 4-inch.

New Richland in Line for Natural Gas Service

Peoples Natural Gas Co., subsidiary to Northern Natural Gas Co., Omaha, Neb., has been granted a franchise at New Richland, Minn. Supply will come from Northern Natural's Minnesota extension.

To Serve Oklahoma Cement Plant

Jones & Brooks, pipe line contracting firm of Oklahoma City, Okla., is constructing a 20-mile 8-inch gas line from Holdenville to the plant of the Oklahoma Portland Cement Co.

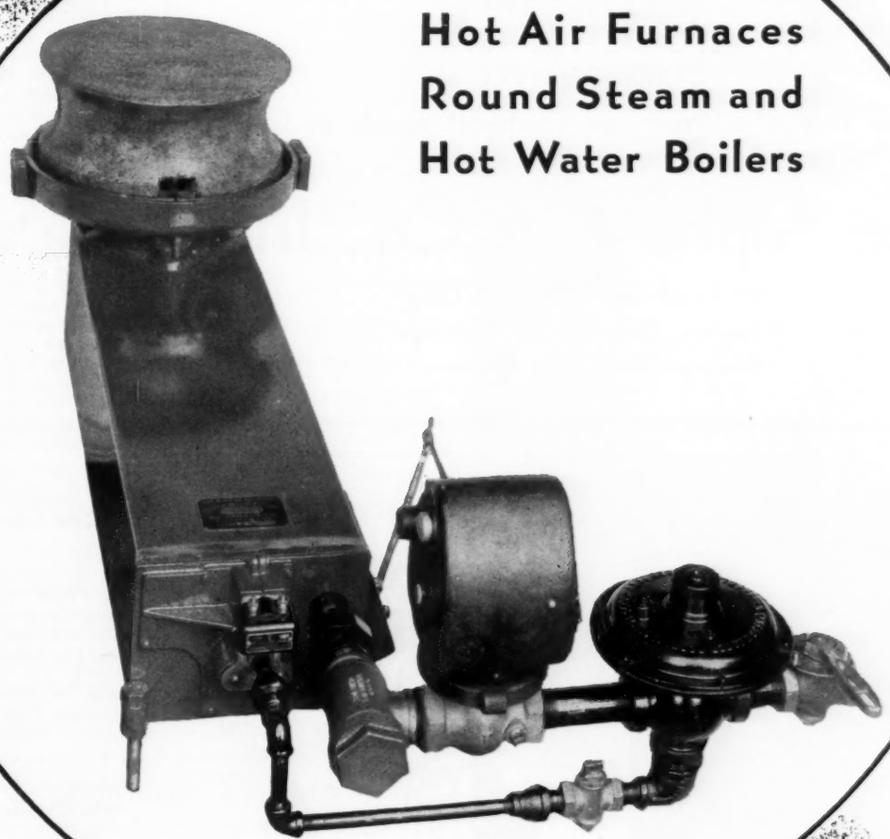
To Vote on Gas Franchise

Tonnes Dennison of Tulsa, Okla., has secured approval of a gas franchise by the city council of Tahlequah, and a franchise election is to be called in the near future.

NEW! A CECO ROUND BURNER

(COMPLETE PACKAGE UNIT)

FOR
Hot Air Furnaces
Round Steam and
Hot Water Boilers



ELIMINATES

- Fragile leaning radiants
- Combustion chamber restrictions
- Premixers and their limitations
- Restricted heat transfer
- Complicated installation and assembly
- Stocking of numerous sizes and simplifies size selection

[ASK FOR BULLETIN DESCRIBING THIS NEW MEMBER OF THE CECO FAMILY]

COMBUSTION EQUIPMENT COMPANY
GENERAL OFFICES: KANSAS CITY, MO.
WICHITA MEMPHIS HOUSTON

LUX PURIFYING MATERIAL

MOST ECONOMICAL BECAUSE
MOST EFFICIENT
ALSO LASTS LONGER
QUICK DELIVERY

We Can Deliver to West and Southwest Equally as Low in Price as in Middlewest

The Alpha-Lux Co., Inc.

192 Front St., New York City
Branches: Philadelphia, Chicago
Storage Base: New Orleans

For smart living... this exclusive apartment hotel in the heart of the famous Wilshire District, overlooking beautiful Westlake and Lafayette Parks.

Rates on Application

Phil Poirier, Manager

The Arcady
2619 WILSHIRE BLVD.
LOS ANGELES

New Low Rates in HOLLYWOOD

$3 ROOM WITH BATH
$4
$5

Right in the heart of Hollywood—with interesting places to go—people to see and things to do.

Write for Booklet. Vacation Bureau

ROOSEVELT HOTEL
ROBERT J. McCABE, MANAGER
HOLLYWOOD, CALIFORNIA

American Radiator Buys Capital Stock of Amer. Gas Products Corp.

American Radiator & Standard Sanitary Corp., through its radiator and boiler subsidiary, American Radiator Co., has acquired all the capital stock of American Gas Products Corp.

American Gas Products Corp., as a division of American Radiator Co., will retain its present general offices in the Chrysler Building, New York City. The officers and executives are: President, William T. Rasch; vice-president, manufacture and development, Edward R. Downe; vice-president of sales, H. Leigh Whitelaw; secretary and treasurer, Frank J. Mullany; general manager of sales, Harvey H. Dugdale; director of research, Carl H. Flink.

The acquisition of American Gas Products Corp. represents a step in American Radiator's program involving the manufacture and sale of a complete line of gas-fired equipment for public utilities and also for the heating and plumbing trade.

American Radiator now manufactures gas boilers and gas radiators. A line of gas ranges and new hot water heaters will soon be in production.

The sales policy of American Gas Products Corp. will remain unchanged.

Henry L. Doherty Given Honorary Degree of Doctor of Engineering

Henry L. Doherty, president of Cities Service Co. and of Henry L. Doherty & Co. and a member of the board of directors of the American Gas Association, was given the honorary degree of Doctor of Engineering recently by Lehigh University, "in recognition of his contributions to the art and science of gas, electric and petroleum production, distribution and utilization."

Gas Equipment for Boilers of City Lighting Plant

The City of Lamar, Colo., is reported to be considering the installation of complete gas equipment as a boiler fuel in the municipal electric light plant. H. A. Salter, general manager of Colorado Gas & Utilities Co., has submitted a contract which the city council has under consideration. The company in 1930 completed a line from the Hugoton fields in Kansas to Lamar and other cities in eastern Colorado.

Interstate Power and Light Asks Ellendale Franchise

Representatives of the Interstate Power Co., controlled by the Utilities Power and Light Co., Chicago, have applied for a franchise for the service of natural gas in Ellendale, Minn.

Porter W. Martin Doing Special Work for Federal Light & Traction

Porter W. Martin, formerly with Continental Construction Co., now headquartered at Chicago, Ill., has been sent to Hot Springs, Ark., on special gas engineering work for the Federal Light & Traction Co.

Eureka, Kan., in Line for Natural Gas Service

Reports are current to the effect that the Western Natural Gas Co., Salina, Kan., plans to distribute natural gas in Eureka, Kan., through a 50-mile 6-inch line from gas fields in Elk County.

"ELECTROLUX *has captured* the public imagination *with its modern use of gas*" *says*

Mr. WALTER C. BECKJORD
Vice-President and General Manager
Boston Consolidated Gas Company

"IN THE FIRST PLACE, the gas refrigerator freezes with heat. That alone makes it dramatically different from other automatic refrigerators.

"In the second place, an automatic refrigerator represents the most typically modern home appliance of today. Thus, every Electrolux spreads the story of the modern, up-to-date appliances the gas company has to offer. For these two reasons, Electrolux has captured the public imagination with its modern use of gas."

Were the Electrolux merely a good load-builder, it would rank high among the useful appliances sold by the gas company. Were it only a faithful domestic helper, most companies would be glad to offer it to their customers. But because it carries the interest, the dramatic value of "freezing with heat," it has in but a few years won a unique place in the gas industry. Electrolux refrigerators give the gas company an opportunity to demonstrate that gas *is* the modern fuel, that houses should be all-gas houses. The day-in and day-out trouble-free operation of Electrolux has become an important factor in winning public approval of gas-operated appliances.

Making a refrigerator department succeed is not difficult—dozens of gas companies have proved that. But like everything worth-while, it does take time and work. To help you, our sales department has prepared a number of carefully worked out plans, catalogues and newspaper announcements. To secure this valuable co-operation, write to Electrolux Refrigerator Sales, Inc., Evansville, Ind.

A tiny gas flame takes the place of all moving parts

ELECTROLUX
THE *Gas* REFRIGERATOR

VITEX
GAS VENT AND FLUE PIPE
Light – Durable
Insulating
Non-corrosive
PLANT RUBBER and ASBESTOS WORKS
537 Brannan Street · San Francisco
PR-102

SOUTH CHESTER STEEL PIPE
Excels for Gas Service
The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.
SOUTH CHESTER TUBE CO.
Chester, Pa.

IMUNOL
Reg. U. S. Pat. Office
U. S. and Foreign Patents Granted

WILLIAMS
GAS STEAM RADIATOR
Made in 22 sizes from 26 to 180 feet of rating.
IMMEDIATE HEAT AUTOMATIC LIGHTER
Improved Combustion. Positive Gas Control.
Write for descriptive matter and prices.
WILLIAMS RADIATOR COMPANY
1865-1873 Cordova St. Los Angeles, Calif.

Change in Financial Structure of No. American L. & P. Subsidiaries

Kansas Power & Light Co., headquartered at Topeka, Kan., has been granted permission to issue stock in the amount of $24,600,000. It is reported that the company plans to take over the obligations and management of United Light and Power Co., Kansas Pipe Line & Gas Co., Western Gas Co., Western Pipe Line Co., McPherson Gas Co., and Kingman County Gas Co. All are direct or indirect subsidiaries of North American Light & Power Co., Chicago, Ill. Albert M. Patten, president of Kansas Power & Light Co., is quoted in press reports as saying that the move is primarily to change the financial structure of the companies.

Gas Fired Enameling Furnace Installed at Dallas

A custom-built enameling furnace, said to be the largest gas-fired furnace in the South, has recently been assembled in the Dallas plant of Texlite, Inc., makers of duco and porcelain enamel signs. This is a muffle type furnace, operating on a 4,000 Emco meter, and consuming 2,500 cubic feet of gas per hour. A 6-inch Maxon Premix burner is used in the furnace, operating under 7 pounds pressure. A temperature of 1,800° F. is maintained constantly for baking steel stock in the priming process, and for fusing of steel with applied porcelain enamel in the final finish.

New Rate Schedule for Billings Gas Co., Billings, Mont.

The Billings Gas Co. of Billings, Mont., subsidiary of Ohio Oil Co. has changed its rate schedule with reductions amounting to from 20 per cent to 9.9 per cent. The new base rate will be 50 cents per M. c. f., as compared with a previous rate of 62½ cents per M. c. f. The company serves Billings, Bridger, Edgar, Fromberg, Joliet, Laurel, Park City and Silesia, all in Montana. The reduction was effective August 1.

Moody-Seagraves Leases 40,000 Acres in Oregon

The Moody-Seagraves Co., Houston, Texas, has leased approximately 40,000 acres in the Willamette basin in Oregon. On completion of its leasing operations, the company is reported to be planning a test to 5,000 or 6,000 feet for gas and oil. Dorsey Hager is said to be representing Moody-Seagraves interests in the project.

New Mexico Pipe Line Companies Must Pay $25 Transporting Fee

A new law has been passed in New Mexico, whereby all gas and oil companies will be required to pay a fee of $25 per year for transporting oil and gas. The provision is in the form of an amendment to the commission's rules regulating pipe lines and was made effective on July 10.

Henry L. Doherty Buys Interest in Kansas City Journal-Post

Henry L. Doherty, head of the Cities Service organization, recently announced the purchase of a half interest in the Kansas City Journal-Post.

"Why doesn't she install Natural Gas heating?
It would be just as warm and pleasant here as in my apartment!"
My wife has the same instant hot water service at home...
INSTANT hot water costs less per gallon because of cheap Natural Gas
PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned·Operated·Managed by Californians

These advertisements, reproduced here in miniature, and others, will appear in newspapers during the month of September

How Are Your Heating Sales Going?

COMMENTS from the H. R. Basford Company, San Francisco, indicate that gas appliance dealers have an unusual opportunity to increase the quality and quantity of their heating sales this season. If you are interested in increasing your sales, it will be worth your while to read the following excerpts from the H. R. Basford Co. letter:

> "Your advertisements, featuring the Special Summer Sale of heating appliances, tell the story of gas heating in a forceful way and embody one great fundamental —the urge to buy now.
>
> "This advertising campaign . . . has greatly stimulated the interest of the public . . . which is reflected in an increase in our business far beyond our expectations.
>
> "We feel that the *cooperative* plan which is now in effect has greatly stimulated the sales of gas heating equipment of the better class for all dealers and we look forward to a large and satisfactory heating season." . . . G. P. Egleston, General Manager, H. R. Basford Co.

The "cooperative plan" mentioned by Mr. Egleston refers to the line in P. G. and E. advertisements which reads, "Have your Heating Dealer or P. G. and E. submit a proposal to install Gas Heating Equipment." With this fact in mind, the H. R. Basford Company increases sales by running an advertisement along side of P. G. and E. advertisements. You, too, can increase your sales by using this method of directing prospects to your store.

For information concerning publication dates of P. G. and E. appliance advertising, call your local newspaper offices each week or at any time you wish to direct new prospects to your store with tie-in advertising.

PACIFIC GAS AND ELECTRIC COMPANY

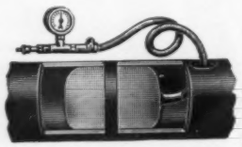
P·G·and E·

Owned·Operated·Managed
by Californians

THE
GOODMAN
STOPPER

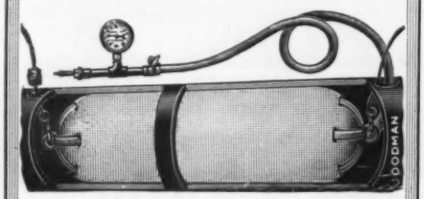
WHEN LOCKED IN PLACE IT HOLDS

DEPENDABLE GAS
MAIN BAGS



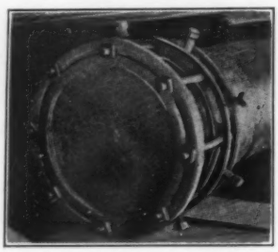
Type C

GOODMAN CYLINDRICAL
STOPPER FOR INTER-
MEDIATE PRESSURE



Increased Length for Increased Pressure

KRUPA-HENDRY
TEST CAP



For Testing High Pressure Lines

SHIPMENTS FROM STOCK

SAFETY GAS MAIN
STOPPER COMPANY

523 Atlantic Avenue
BROOKLYN, N. Y.

Pac. Coast Rep.: C. B. Babcock Co.
135 Bluxome Street, San Francisco
California

CLASSIFIED ADVERTISING

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge.

SITUATIONS WANTED—MALE

Accountant and auditor with over 25 years experience, desires position. Applicant is experienced in practical diversified accounting with public utility companies, particularly gas and oil. Can take complete charge of department, and can furnish financial statements and all necessary reports. Will work for a moderate salary and can supply excellent references. Address Box E-151, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Position wanted as manager of gas property, 20 years' experience in coal, water, and natural gas distribution, high and low pressure. Applicant has excellent record as merchandiser. Can report at once. Address Box E-153, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Salesmanager and supervisor experienced in merchandising and promotional work, desires position. Has also had experience in domestic and commercial sales of load building appliances. Prefer to locate in central states in natural gas area where there is opportunity to promote extensions and build up sendout. References furnished. Address Box 143, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Gas engineer—technical graduate, married, experienced in operation of coal and water gas plants, distribution, plant design and construction, expert operation and appraisals, desires connection with operating or engineering company. Address Box E-145, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Gas heating engineer-salesman; experienced in layout, estimating, design and installation. Twelve years of heating experience; 3 years manufacturer's representative on coal furnaces; 2 years on natural gas change over. Familiar with competitive fuels. Address Box E-141, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Position wanted by experienced engineer in either natural gas compressor station or gasoline plant. Applicant has had over 8 years experience in both plant operation and construction, and would prefer to locate in the Western area, but will go anywhere. Address Box E-149, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Salesman and engineer, now employed, wishes to make change. Age 36, college graduate in mechanical engineering. Applicant has had 12 years experience in selling and supervision in the natural gas industry. Would like to connect with company interested in gas development or public utility. Experience record and references can be furnished. Address Box E-147, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Merco Nordstrom Supplies Valves for Two New Carriers

Merco Nordstrom Valve Co. announces receiving an order for the installation of Nordstrom valves on the two new gas transmission lines of the Montana Power Co. of Butte. These valves will be installed along the entire 20-inch line from Cut Bank to Butte, and have been installed on the 10-inch line extending from the Dry Creek field to Livingstone and Bozeman. The latter line was completed in August.

The company announces that an order has also been received from Southern Fuel Co. for valves to be used on the 26-inch carrier from Kettleman Hills to Long Beach and Los Angeles.

Booster Station to Increase L. A. Line Capacity to 72,000,000 Cubic Feet

Work was begun early in August on a 10-unit booster station for the Ventura Fuel Co., Los Angeles, the new plant to be located about 3 miles west of Somis. The 10 units will be 175-H. P., Cooper-Bessemer, assembled from other plants. Construction is expected to be complete on the plant by October 1, and the line capacity will be increased from 54,000,000 to 72,000,000 cubic feet daily. Fluor Corp. has the contract. Cost of the plant is estimated at $175,000.

H. C. Ross Scheduled to Speak at Building Officials Meeting

H. C. Ross, engineer of utilization for Pacific Gas and Electric Co. of San Francisco, Calif., will deliver an address on "Construction for the Use of Gas in the Modern Home" at the annual convention of Pacific Coast Building Officials Conference to be held October 5-10 at Berkeley, Calif.

Houston Pipe Line Reports Gain in Operating Income

Houston Pipe Line Co., and Houston Oil Co. of Houston, Texas, report a net income of $233,509 for the quarter ended June 30, 1931. This compares with $228,703 for the similar period of 1930, or a gain of $4,806.

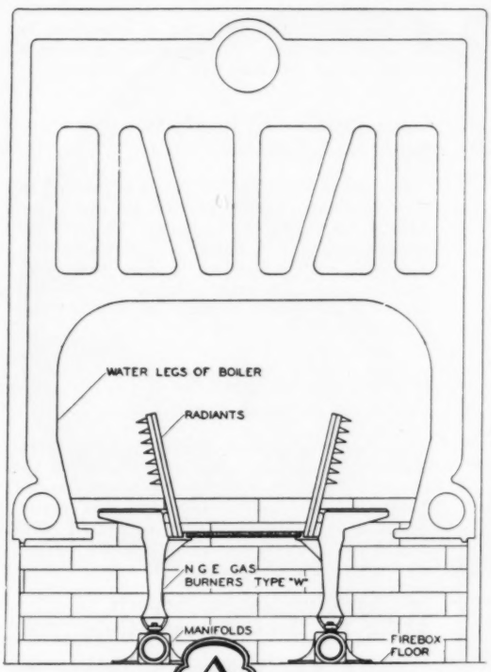
Mitchell Now Agent for Community Natural at Clifton

Alfonso Mitchell has recently replaced Bart Perry as agent of the Community Natural Gas Co. at Clifton, Texas. Mr. Perry will be outside foreman at Hamilton, Tex.

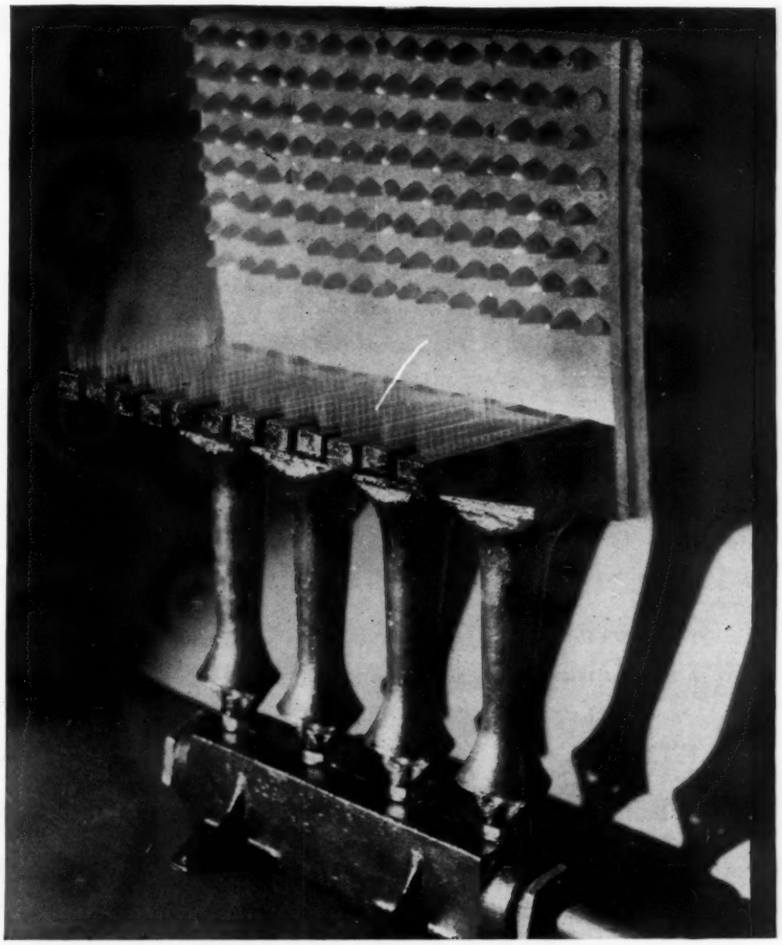
EVEN

an apprentice can install this simple UNIT SYSTEM

Easiest to install
No shop work necessary
Minimum stock required



WILGUS REGULATORS
N. G. E. GAS BURNERS
ANUBIS DIFFERENTIAL PRESSURE RECORDERS



N. G. E. Type "W" GAS BURNERS

FOR LOW PRESSURE BOILERS

The N. G. E. Type W Gas Burner fits any size of low pressure steam boiler. The required capacity of the installation is built up unit by unit from Standard 2-, 3- and 4-burner manifolds right on the job. The burners fitting into the manifold units are all ONE standard size and the radiant plates join together into one compact assembly without cementing.

FEATURES—Flame located at grate level close to water legs. Radiants generate large amount of heat. Flame and hot products confined near primary combustion surfaces. Secondary air brought in only around burners. A positive definite circulation of water in boiler insured. No backfiring. Quiet. No vibration or panting. Uniform combustion. Flame can be turned down very low. Perfect for heating boilers in public buildings and industrial plants. Ask for Catalog.

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Pilot Tips and Burner Heads

INNUMERABLE STYLES ARE BEING
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INDUSTRIAL GAS BURNERS FOR PIPE BURNERS

Our patented lava tips for natural and manufactured gas are specified for many industrial uses, including smoke houses, core ovens, japanning ovens, soft metal ovens, etc. The lava tip will not corrode, oxidize, soot or otherwise become clogged. It is preferable to metal tips, particularly where natural gas is used and, barring accidents, is practically everlasting.

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Clip and mail today to

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Efficient Installation of Gas Appliances Aim of Plumbers

A movement to bring about more efficient installation and inspection of gas appliances in San Mateo and Santa Clara Counties, Calif., is being sponsored by the Peninsula Merchant Plumbers Association and the Peninsula Plumbing Inspectors Association. At a recent meeting attended by plumbers and plumbing inspectors of 17 different towns and districts in the two counties, it was decided to attempt the enactment in the various cities of uniform ordinances covering gas appliance installation and inspection. After this has been accomplished it is planned to ask the county boards of the respective counties to pass similar ordinances affecting unincorporated areas.

Ordinance Regulating Gas Installations Passed in Springfield

An ordinance was recently passed in Springfield, Mo., providing that the city plumbing inspector shall supervise all house-piping, vents, appliances, fixtures and apparatus installed for the use of gas, and that gas fitters shall be required to pass an examination before being qualified to work at that trade, and shall post a $1,000 bond with the city of Springfield. The new ordinance is now a part of the city's plumbing ordinance.

Iowa Gas Distributing Co. In Franchising Activity

Iowa Gas Distributing Co., affiliated with Missouri Valley Pipe Line Co., Omaha, Neb., has applied for a franchise for the service of natural gas in Boxholm, Iowa. An election was scheduled to be held in Dayton, Iowa, on August 28 for granting a franchise to the same company. Farnhamville granted a permit to the company early in August.

Ozark Distributing Ready to Serve Norborne, Mo.

Gas service is expected by September 1 in Norborne, Mo., according to an announcement made by L. M. King, district manager for the Ozark Distributing Co. at Carrollton. The line is 10 miles long and is being constructed of 6-inch pipe. Ozark Distributing Co. is a subsidiary of the Gas Service Co., Kansas City, Mo.

Net Operating Gain for Louisiana Power & Light Co.

Louisiana Power & Light Co., New Orleans, La., reports a gain of $338,529 in net operating revenue for the 12 months ended June 30, 1931, net revenue for that period amounting to $3,092,310 as compared with $2,753,781 for the previous 12-month period.

Middle West Utilities Reports $8,005,393 Gross Revenue Gain

Middle West Utilities Co., Chicago, reporting for that company and subsidiaries, notes a gain of $8,005,393 in gross earnings for the 12 months ending June 30, 1931, over the corresponding period a year ago.

Additional Stock Issue

Electric Bond & Share Co., New York, is offering an additional issue of 100,000 shares of preferred stock, par value $89.75 per share.

A Popular Priced Gas Burner—

Johnson Junior

The Johnson Junior line of gas burners is unique in several ways. The popular price feature is of course a headliner. Despite the low cost, the Johnson Junior is a dependable, efficient unit worthy of any home. We have an interesting story to tell about the Johnson Junior—write for it.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative—C. B. BABCOCK CO.
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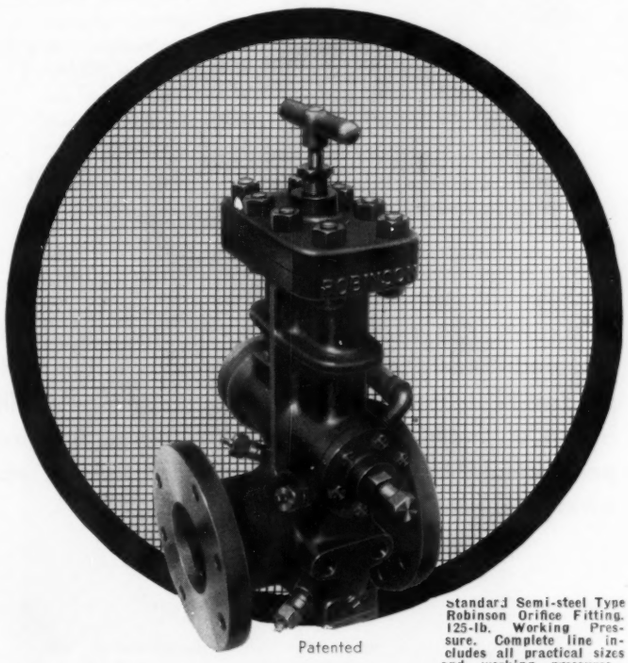

Patented

Standard Semi-steel Type Robinson Orifice Fitting. 125-lb. Working Pressure. Complete line includes all practical sizes and working pressures.

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ORIFICE PLATES!!!

Frequent orifice plate inspection and calibration is the only means of preventing thieving either to yourself or your customers. It takes but very little wear or corrosion on the plate edges to accumulate unbelievably large metering errors. THE ROBINSON ORIFICE FITTING makes frequent inspection easy without by-passing or shutting off the flow.

Nearly 13,500 ROBINSON ORIFICE FITTINGS have been installed on pipe lines in the past five years—a fact worth remembering. ALL have given accurate metering at lowest cost—another fact worth remembering.

So when you want to stop for all time the activities of thieving orifice plates and maintain metering accuracy, install ROBINSON ORIFICE FITTINGS. Your copy of the latest Robinson Catalog will be mailed on request.

NEARLY 13,500 IN SERVICE

Extremely PRACTICAL and Usable

No Time Lost! No Power Wasted No Excess Tonnage!

ABOVE all the Cleveland Baby Digger is practical. Here's a compact, mobile, powerfully built trencher, that you'll constantly keep busy because of its extreme usability on gas trench work.

Only 58 inches wide over-all and mounted on full crawlers, it maneuvers quickly in the close quarters, slipping easily past or between poles, trees, hydrants, etc.

Weighing approximately 4 tons it is stripped of all excess tonnage assuring exceptional mobility. This means ease of handling, simplifies the traversing of soft ground and assures unexcelled transportation.

Designed right and quality built, there is no waiting for favorable conditions with the Baby Digger. No power is wasted. No time is lost. It delivers steady, consistent work and has the in-built stamina to stand up under the hardest service, on the toughest tasks.

Write today for full information.

The Cleveland Trencher Co.

"Pioneers of the Small Trencher"

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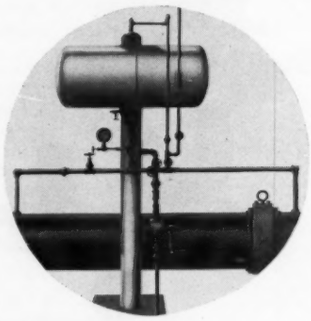
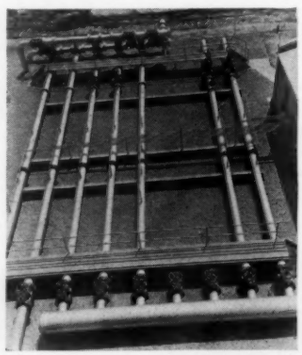
THE CLEVELAND BABY DIGGER

Dominant IN THEIR FIELD...

The Papico method of odorization combines safety with economy in its effective treatment of natural gas.





A Papico Meter run of smooth wall calibrated pipe, Van Stone Laps, with special pressure tap construction, installed at the Slauson Avenue measuring station of the Southern California Gas Company.

Wherever gas or fluid is to be controlled or metered through pipe lines, Papico equipment predominates. Scientifically designed and built by an engineering organization with years of experience in this field, Papico equipment is safe, accurate and economical to operate and install.

PAPICO

Papico products include: Natural Gas Odorizing Systems, Orifice Meter Setups, Multi-tube Straightening Vanes, Perfection Duplex Mercury Traps, Indirect Non-liming Water Heaters, Pipe Bending, Coiling and Van Stoning.

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The tendency to compact homes, and the proven success of Natural Gas for heating, calls for the economy and efficiency of the

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Electrogas

FLOOR FURNACE

Here is a sterling, time-proven product, built by a young, aggressive organization, PLANNING AHEAD!

Dealers in all communities are invited to write in for details of our NEW, LIVE, COOPERATIVE PROPOSITION—a real profit-maker for live wires!

Safe- Durable- Efficient

Electrogas Furnace Co.
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[See our complete display of five AGA approved models at the Pacific Coast Gas Ass'n Convention, San Francisco, August 31 to September 5.]

Test these new **SPARK** *gas circulating heaters at OUR expense*

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Ivory and Green Marbleoid Porcelain
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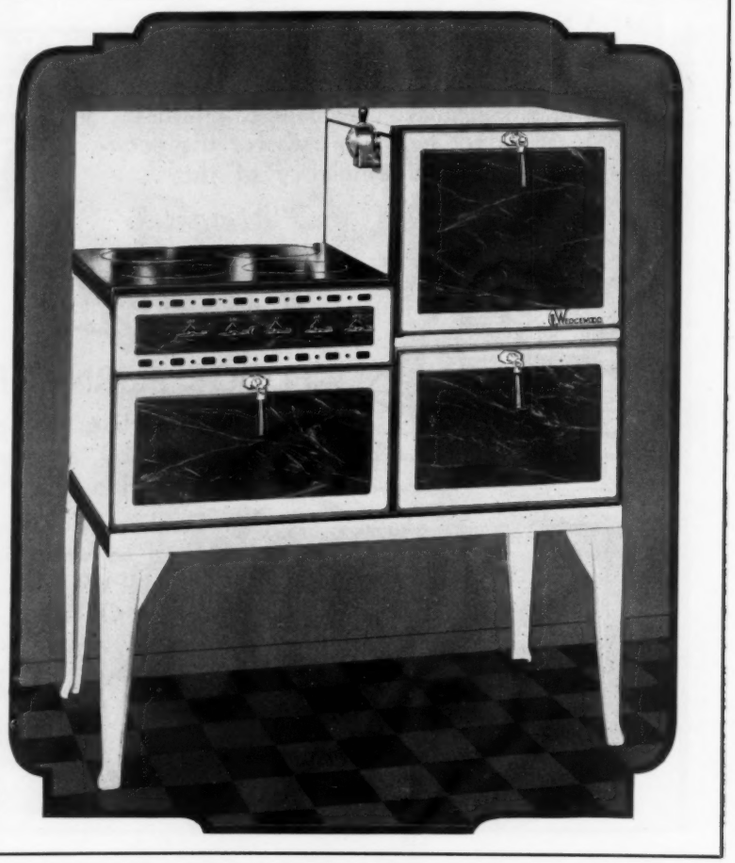
Same model and finish with open-top.
The open-top range has green porcelain grates.
As advanced in efficiency as it is in design.



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Largest Stove Manufacturers in the West
A Pioneer That Is Still the Leader
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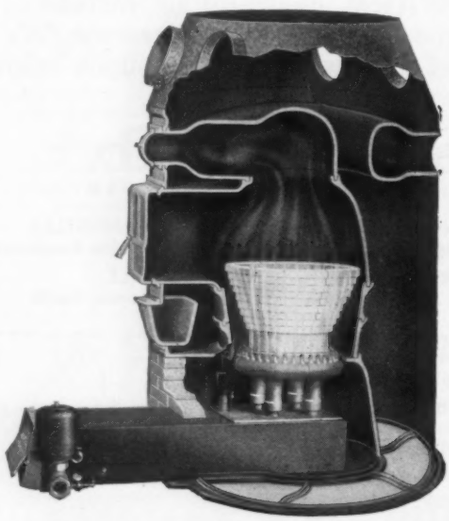
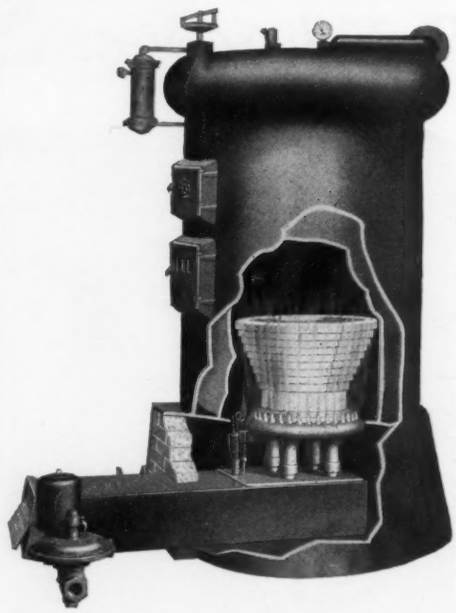
INSTALLATION AND OPERATION

The new Maxon Automatic Gas Burner incorporates distinct advance in simplicity of design which deserves your consideration.





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No worried looks on the faces of *this* gang when the gas pressure comes on! They know every joint of this 2-inch McWane-Pacific threaded high-pressure *Cast Iron* main is tight. Recess-threaded (without couplings), and every inch everlasting, rust-proof cast iron pipe.

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There's a McWane-Pacific pipe or joint for every pressure, B. & S., plain-ends, threaded, Flexpan, and special joints for every purpose. Pipe sold either with or without joints. Get all the facts on McWane-Pacific pipe superiority.

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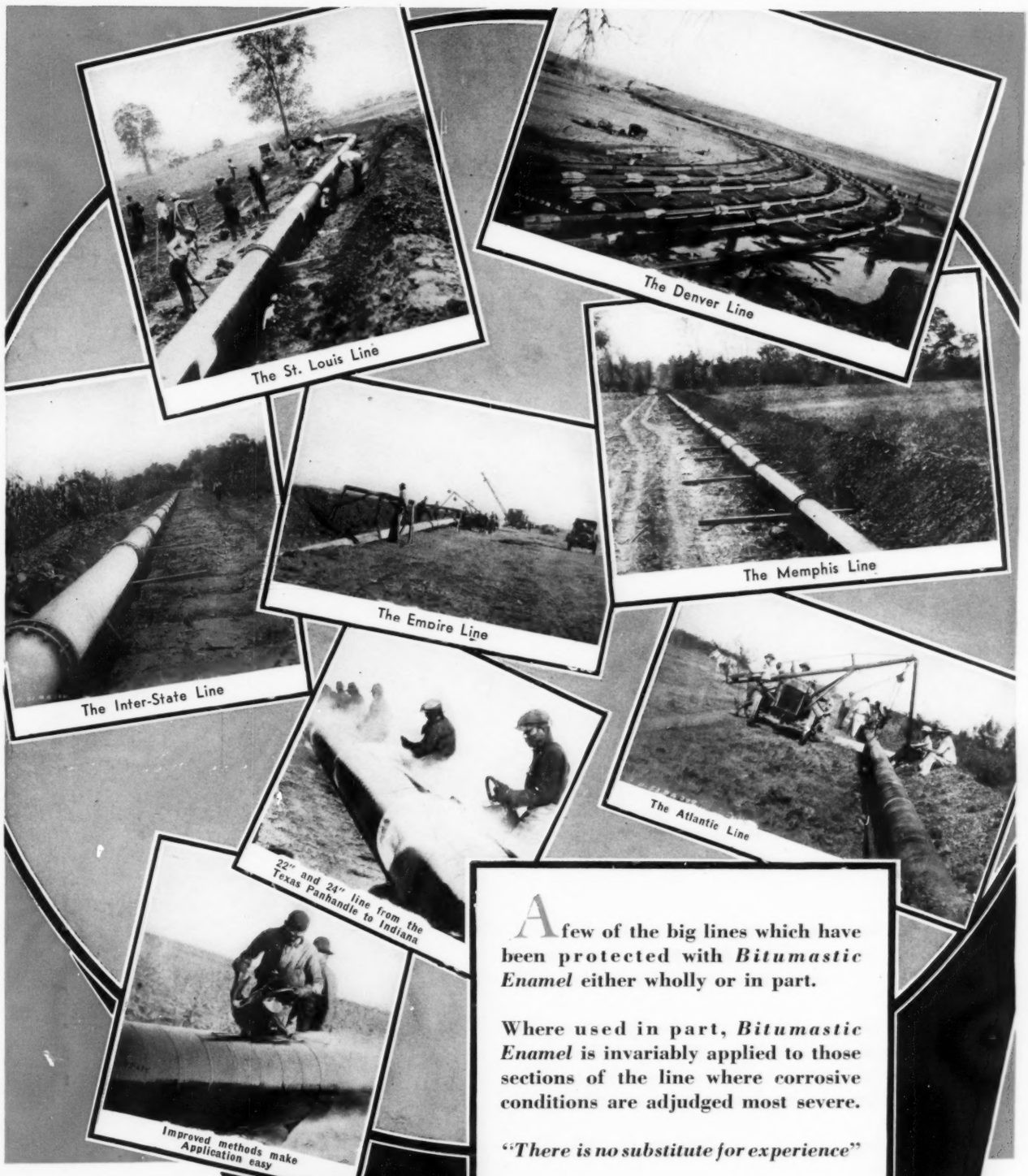
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